JYVÄSKYLÄ STUDIES IN COMPUTING
103

Anicet Yalaho

Managing Offshore Outsourcing of Software Development Using the ICT-supported Unified Process Model

A Cross-case Analysis

JYVÄSKYLÄN YLIOPISTO

JYVÄSKYLÄ STUDIES IN COMPUTING 103

Anicet Yalaho

Managing Offshore Outsourcing of Software Development Using the ICT-supported Unified Process Model

A Cross-case Analysis

Esitetään Jyväskylän yliopiston informaatioteknologian tiedekunnan suostumuksella
julkisesti tarkastettavaksi yliopiston Agora-rakennuksen salissa (Ag Aud. 2)
helmikuun 7. päivänä 2009 kello 12.

Academic dissertation to be publicly discussed, by permission of
the Faculty of Information Technology of the University of Jyväskylä,
in the Building Agora, (Ag Aud. 2), on February 7, 2009 at 12 o'clock noon.

UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2009

Managing Offshore Outsourcing of Software Development Using the ICT-supported Unified Process Model

A Cross-case Analysis

JYVÄSKYLÄ STUDIES IN COMPUTING 103

Anicet Yalaho

Managing Offshore Outsourcing of Software Development Using the ICT-supported Unified Process Model

A Cross-case Analysis

UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2009

Editors
Seppo Puuronen
Department of Computer Science and Information Systems, University of Jyväskylä
Pekka Olsbo, Marja-Leena Tynkkynen
Publishing Unit, University Library of Jyväskylä

Cover graphic´s concept Anicet Yalaho. Realization Christian Pöyhönen.

URN:ISBN:978-951-39-3540-5
ISBN 978-951-39-3540-5 (PDF)

ISBN 978-951-39-3467-5 (nid.)
ISSN 1456-5390

Jyväskylä University Printing House, Jyväskylä 2009

ABSTRACT

Yalaho, Anicet
Managing offshore outsourcing of software development using the ICT-supported unified process model: A cross-case analysis
Jyväskylä: University of Jyväskylä, 2009, 87p. (+ articles)
(Jyväskylä Studies in Computing,
ISSN 1456-5390; 103)
ISBN 978-951-39-3540-5 (PDF), 978-951-39-3467-5 (nid.)
Finnish summary
Diss.

Software-intensive high-tech companies in Western countries are increasingly producing software and related services in developing countries. Despite the rapid progress of offshore outsourcing, there are various risks that must be investigated so that companies can avail themselves of the opportunities this business model offers. Various important benefits can be achieved through the successful management of offshore outsourcing. Numerous studies exist on outsourcing in general, yet the vast majority of extant literature on offshore outsourcing has dealt with information technology (IT) outsourcing from the client's perspective. Several frameworks have been developed that focus on guiding information systems managers in the practice of IT outsourcing. However, none of these frameworks has attempted to provide holistic guidelines for managing the entire process of offshore outsourcing of software production. The main objective of this study is to develop an information and communication technologies (ICT)-supported unified process model of offshore outsourcing that integrates a) offshore outsourcing processes, b) risk management processes, and c) relationship management processes. This study has been undertaken to address this need and to make both theoretical and practical contributions. The research has been conducted through: a) an in-depth review of the literature on outsourcing, IT outsourcing, offshore outsourcing, global software development, distributed software development and ICT; b) an analysis and application of transaction cost theory as a background theory; and c) multiple case studies of four high-tech companies, conducted from both the service provider's and client's viewpoints using an interpretive approach. This study introduces a new ICT-supported unified process model of offshore outsourcing that can be applied in a wide range of settings in both research and management. The integrative model provides a holistic management process that can guide organizations in their offshore outsourcing efforts. This study also identifies factors that lead to success in and create risks/barriers to the execution of an ICT-supported unified process of offshore outsourcing. Having knowledge of these factors can help both offshore service clients and providers.

Keywords: Outsourcing, Offshore Outsourcing, Offshore Software Development, Unified Process, Relationship Management, Risk Management, Key Success Factors, Information and Communication Technology, ICT Support, Transaction Cost Theory

ACM Computing Review Category

D.2.9 Management (K.6.3, K.6.4): Copyrights, Cost estimation, Life cycle, Productivity, Programming teams, Software configuration management, Software process models (e.g., CMM, ISO, PSP), Software quality assurance (SQA), Time estimation
K.6 Management of Computing and Information Systems: General, Economics
K.6.1 Project and People Management: Staffing, Strategic information systems planning, Systems development, Training
K.6.3 Software Management (D.2.9): Software development, Software maintenance, Software process, Software selection
K.6.4 System Management: Centralization/decentralization, Management audit, Quality assurance

Author´s address Yalaho, Anicet
Department Computer Science and Information Systems
University of Jyväskylä
P.O.BOX 35 (Agora), FIN-40014 University of Jyväskylä, Finland
anicet.yalaho@jyu.fi , anicet.yalaho@gmail.com

Supervisors Nahar, Nazmun
Department of Computer Science and Information Systems
University of Jyväskylä

Heikkilä, Jukka
Department of Computer Science and Information Systems
University of Jyväskylä

Reviewers Sena, Jim
Orfalea College of Business
California Polytechnic State University
San Luis Obispo, California, USA

Sundeep, Sahay
Department of informatics, University of Oslo
Informatikkbygget, Gaustadalléen 23, N-0371 Oslo
Norway

Opponent Donald R. Chand
Department of Computer Information Systems
Bentley University, Waltham, Massachusetts, USA

ACKNOWLEDGMENTS

I would like to extend my deepest gratitude to all those who stood by me through my doctoral program. This effort—completing my Ph.D. at the University of Jyväskylä—would not have been possible without the support of many people.

Particularly, my sincere appreciation for my academic supervisor, Dr. Nazmun Nahar, will forever remain beyond words. Without her persistent support, expert guidance, encouragement and inspiration from the commencement of this research project, completing this study would have been impossible. In her supervisory responsibility, she has combined thorough constructive criticism with mentorship, giving me the knowledge, skill and confidence required to reach this goal. I have greatly benefited from her extensive experience in conducting research, making quality reviews and preparing scientific articles in a professional manner; this is reflected in my publications, including those that are part of this thesis. With Dr. Nazmun Nahar, the long meandering road became shorter, and it now opens onto horizons that I will explore independently.

I am grateful to Prof. Jukka Heikkilä (Jups) for his suggestions and comments during the early stage of my thesis. He also gave me an opportunity to teach in our department, which has allowed me to put my skills into practice and gain some teaching experience. He especially stood by me during difficult moments in the department throughout my doctoral program. It is possible that without his multiple forms of support as Dean and as supervisor, I would not have had the strength and the mental peace required to complete this dissertation. I am deeply thankful.

I am grateful for the financial assistance that COMAS (the Graduate School in Computing and Mathematical Sciences of the University of Jyväskylä) provided me. I would also like to acknowledge the financial and other assistance that I received from the Department of Computer Science and Information Systems, which has been very helpful as well.

My gratitude goes out to INFWEST IT for providing a platform through which Ph.D candidates in Finland get an opportunity to meet with and confer with top scholars in the field of information systems. In this regard, I am indebted to the insights that I received at various doctoral seminars where the following luminaries of the information systems (IS) field were in attendance: Prof. Juhani Iivari (University of Oulu, Finland) and Prof. Kalle Lyytinen (Case Western Reserve University, USA). Special thanks to: Prof. Allen S. Lee (School of Business, Virginia Commonwealth University) and Prof. Suprateek Sarker (Washington State University) for their comments and advice on the early draft of my thesis; I must also thank senior researcher N. Huda (Tallinn Technical University) for his critical and insightful reviews of several papers of mine included in this dissertation and in introduction. I thank Prof. Heinz K. Klien (Temple University) and Prof. Cathy Urquhart (University of Auckland) for

exposing me to data coding techniques in the qualitative method. Prof. Urquhart's hands-on advice has enabled me to grasp the method. Thanks to Prof. Michael D. Myers (University of Auckland Business School) and Prof. Michael Newman (Manchester Business School) for their advice on the philosophical stance of qualitative method and their hand-on approach to reporting qualitative research. Finally, I thank Prof. Rudy Hirshheim and Assoc. Prof. Kate M. Kaiser for their updated information and comments on offshore outsourcing.

I am deeply grateful to Prof. Franz Lehner, University of Passau-Germany, first, for accepting my visit as a guest lecturer at his department, and secondly, for providing me with critical and constructive comments during the research seminar where I was the key presenter. He contributed a noteworthy volume of insight to my research.

I am thankful to Prof. Jim Sena (Industrial Technology and Management, Orfalea College of Business, Cal Poly State University, San Luis Obispo, USA, and Prof. Sundeep, Sahay, Department of informatics, University of Oslo, Informatikkbygget, Oslo, Norway for reviewing my thesis. I deeply appreciate their suggestions and comments.

My gratitude also goes to Prof. Donald R. Chand, Department of Computer Information Systems, Bentley University, Waltham, Massachusetts, USA, who has officially been appointed to serve as the opponent/examiner at the public defence of my dissertation

During this research process, I benefited in many ways from the favorable research environment, cooperation, support and encouragement that I received from the academic and administrative staff at the Department of Computer Science and Information Systems, University of Jyväskylä. I would like to thank the following individuals: Prof. Pasi Tyrväinen, Prof. Markku Sakkinen, Prof. Pekka Neittaanmäki, Prof. Seppo Puuronen, Prof. Jari Veijalainen, Prof. Tommi Kärkkäinen, Dr. Mauri Leppänen, Dr. Samuli Pekola, Dr. Minna Koskinen, Dr. Jan Pawlowski, Dr. Oleksiy Mazhelis, Dr. Mirja Pulkkinen, Ms. Eija Ihanainen, Ms. Kirsti Kärkkäinen, Tapio Tammi, Katy Clements, Marjo Halmiala Mr. Jouko Kääriäinen, Mr. Jari Rahikainen, Ms. Lea Hakala and Mr. Jari Lepisto.

My special thanks go to my dear friend Paul Abbe for being there when I needed his help in editing my papers. I also thank Dr. Koissi Niangoran, Dr. Filio Degni, Dr. Sylvestre Degni , Dr. Princeley Ifinido, Dr. Kodiah Beyeh, Jovin Greye, Bernard Ble Wongui, Augustin Muyiah, Ms. Sidonie Yai (Chantale) and Richard Yai for their love and care. I would like to express my sincere gratitude to my parents Anatole and Bangny Makoura Adel Yalaho, as well as my uncles Banhi Toucha and Banhi Jacques, for making me see the value of education since my youth. Finally, I thank my family—my girlfriend, Sanna Juutinen, and my children—for coping with my absence during the period of this study.

Jyväskylä
January 2009

Anicet Yalaho

FIGURES

FIGURE 1 Relationship of the included articles 18
FIGURE 2 Offshore outsourcing models, adapted from Erber and Sayed-Ahmed (2005) 23
FIGURE 3 Research model 44

TABLES

TABLE 1 Relevant prescriptive model adapted from de Boer et al. (2006) 33

LIST OF INCLUDED ARTICLES[1]

I. Yalaho, A. A Conceptual Model of ICT-Supported Unified Process of Offshore Outsourcing of Software Production. Journal of Information Technology for Development *(Resubmitted according to editor comments)*.

II. Yalaho, A. and Nahar, N. The ICT-Supported Unified Process Model of Offshore Outsourcing of Software Production: Cross-case Examination and Validation. The DATA BASE for Advances in Information Systems *(Submitted)*.

III. Yalaho, A. (2007). Plugging into Offshore Outsourcing of Software Development: A Multiple Case Study. Issues in Information Systems Journal, VIII (2), p.499-515.

IV. Yalaho, A. and Nahar, N. 2008. Risk Management in Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study. Journal of Information Technology *(Submitted)*.

V. Yalaho, A., Nahar, N. and Heikkila, J. 2008. Key Success Factors for Managing Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study. European Journal of Information Systems *(under revision according to editor comments)*.

---

[1] The earlier version of each of the abovementioned articles was presented and published in the proceedings of the refereed conferences below.

I. Yalaho, A. (2006). A Conceptual Model of ICT-Supported Unified Process of International Outsourcing of Software Production. 10th IEEE International Enterprise Distributed Object Computing Conference Workshops (EDOCW'06), HongKong, China IEEE Computer Society, 47 -60.

II. Yalaho, A. and Nahar, N. (2007). The ICT-Supported Unified Process Model of Offshore Outsourcing of Software Production: Exploratory Examination and Validation. IN PICMET (Ed.) Proceedings of Portland International Conference on Management of Engineering and Technology (PICMET'07) - The Management of Converging Technologies, Oregon, Portland USA, 1466-1483. CD ISBN 1-890843-15-6

III. Yalaho, A. (2007) Plugging Into Offshore Outsourcing of Software Development: A Multiple Case Study. In Willoughby, L. (Ed). Proceedings of the 47th Annual IACIS International Conference. Vancouver, British Columbia, CANADA, 1-2.

IV. Yalaho, A. and Nahar, N. (2008) Risk Management in Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study. Proceedings of the Technology Management for a Sustainable Economy, Portland International Conference on Management of Engineering and Technology (PICMET'08). Cape Town, South Africa, 1721-1748 CD ISBN 1-890843-18-0

V. Yalaho, A., Nahar, N. and Heikkila, J. (2008) Key Success Factors for Managing Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study. In Palvia P., N. Baqir and K. Bagchi (Ed) Proceedings of the Global Information Technology Management Association World Conference (GITMA), Atlanta USA, 161-162.

CONTENTS

ABSTRACT
ACKNOWLEDGEMENTS
FIGURES AND TABLES
LIST OF INCLUDED ARTICLES

1 INTRODUCTION 11
1.1 Background of the study and research need 11
1.2 Research Problem and Questions 14
1.3 The Objectives of the Study 14
1.4 Motivations for the Research 15
1.5 Scope of the Study 16
1.6 Relationship of the Included Articles 17

2 WHAT IS INFORMATION AND COMMUNICATION TECHNOLOGY-SUPPORTED OFFSHORE OUTSOURCING 19
2.1 What is Outsourcing and Offshore Outsourcing? 19
2.1.1 Historical background, trends and practice of offshore outsourcing 20
2.1.2 Offshore outsourcing models 22
2.1.3 A review of previous prescriptive models of outsourcing and offshore outsourcing 23
2.2 Information and Communication Technology 29
2.2.1 Effects of information and communication technology on offshore outsourcing 30
2.2.2 The capacity of information and communication technology ...30
2.2.3 The information and communication technology support to offshore outsourcing' 31
2.3 Summary 32

3 THEORETICAL BACKGROUND 34
3.1 Transaction Cost Theory 35
3.1.1 Economic influences on the transaction costs 36
3.1.2 Behavioural influences on the transaction costs 40

4 RESEARCH MODEL 42

5 RESEARCH METHODOLOGY AND PHILOSOPHICAL APPROACH ...45
5.1 The Philosophical Approach 45
5.2 Research Design and Method 47
5.3 Codebook Development 50
5.4 Data Analysis 50
5.5 Validity and Reliability 51

6 SUMMARY OF THE ORIGINAL ARTICLES 53
6.1 Article I. "A Conceptual Model of ICT-Supported Unified Process of Offshore Outsourcing of Software Production" 53
6.2 Article II. "The ICT-Supported Unified Process Model of Offshore Outsourcing of Software Production: Cross-case Examination and Validation" 54
6.3 Article III. "Plugging into Offshore Outsourcing of Software Development: A Multiple Case Study" 57
6.4 Article IV. "Risk Management in Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study" 58
6.5 Article V. "Key Success Factors for Managing Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-Case Study" 60

7 CONCLUSIONS, LIMITATIONS AND FURTHER STUDY 62
7.1 Major Contributions of the Study 62
7.2 Major Findings in the context of the Background Theory 64
7.3 Implications for Practice 65
7.4 Limitations of the Study 65
7.5 Future Research Directions 66

REFERENCE 67

APPENDIX 1 Interview questionnaire guide 81
APPENDIX 2 A Snapshot view of Code tree in NVivo7 87

YHTEENVETO (FINNISH SUMMARY) 88

1 INTRODUCTION

This chapter introduces the background of the research. In Section 1.1 it begins by discussing the significance of this research, the research area being the information communication technologies- supported unified process of offshore outsourcing (ICT-SUPOO) for software development and the lack of existing research on this important topic thus far. Section 1.2 defines the research problem and the questions that are the focus of this study. The objectives of the study and motivations for pursuing them are shown in Sections 1.3 and 1.4 respectively. The scope of this research is clearly defined in Section 1.5. To further familiarize the reader, the relationships among the articles included in this dissertation are described in Section 1.6.

1.1 Background of the study and research need

The globalization of resources has led to dramatic increases in cross-country business cooperation. The global software industry is one such business that has experienced exponential growth since the 1980s (Correa, 1995; The Outsourcing Institute, 2004; Greenemeier, 2002; Patane and Jurison, 1994). There are various segments within the global software industries, such as applications and systems development (SD), business process outsourcing (BPO) and so forth.

The offshore outsourcing of software production has become an established way of doing software business. Software-intensive high-tech companies in Western countries are increasingly producing software and software-related services in developing countries (Nahar et al., 2002; Press, 1993; Wu and Lin, 1999). According to Patane and Jurison (1994),

> "Many firms are finding offshore software development a viable alternative to in-house development because of lower cost, inability to hire and retain qualified programmers at home, and the growing need to move swiftly from project initialization to systems installation"(p.7).

Offshore outsourcing has been driven by cost savings (Chen, 1996; Elmuti and Kathawala, 2000). However, recently things have changed (Lacity and Willcocks, 2001, pp. xi-xiv). Firms frequently cite new drivers such as: a) timely access to highly qualified technical talent, b) faster time-to-market and accelerated delivery, c) the ability to significantly expand software development capacity at minimal costs, d) the opportunity to accelerate the improvement of software development processes and quality capabilities by working with world-class offshore companies, e) a reduced risk of cost overruns and late projects completion, f) improved quality of customer service and closer proximity to customers, g) increased competitive ability, and h) enhanced flexibility.

Offshore outsourcing refers to a commercial arrangement where a service client entrusts a foreign service provider with a commission to produce software products or services. This may be seen as the business practice of looking outside a firm for foreign service providers capable of performing various functions that were previously performed in-house or outsourced domestically (Nahar et al., 2002).

Previously, organizations have used various frameworks and models as guidelines for gauging their current state and determining future actions with regard to offshore outsourcing. These include a prescriptive model to guide decision-making (Yang and Huang, 2000; de Boer et al., 2006; Ancarani and Capaldo, 2005), bidding strategies for outsourcing/offshore outsourcing (Nam et al., 1995), strategic analysis (Abdel-Malek et al., 2005), the dynamic optimal control model of internal/external knowledge outsourcing (Gavious and Rabinowitz, 2003), contract management and relationship management (Buchowicz, 1991; Chaudhury et al., 1995; McFarlan and Nolan, 1995) and models describing types of project risks and their properties (Wallace et al. 2004). However, these frameworks and models do not provide systematic guidance about how to execute the entire process of offshore outsourcing for software development. Various authors (Probert, 1996; McIvor, 2000; de Boer et al., 2006) have acknowledged the lack of a practical and systematic account of the method, one that might guide managers in their outsourcing/offshore outsourcing endeavours.

An in-depth literature review reveals that most of the existing prescriptive frameworks or models of outsourcing focus on some specific activities within the outsourcing process or emphasize the general process (e.g., Greaver II, 1999; McIvor, 2000; Rockart and Morton, 1984; Momme, 2001; Momme and Hvolby, 2002; Yalaho et al., 2005; Yalaho and Wu, 2002). For example, the work of Carmel and Agarwal (2002) on the maturation of offshore outsourcing in information technology and the work of Adelakun (2004), which was built on that of Carmel and Agarwal (2002), classified the activities of organizations based on their outsourcing experience. All three authors, mentioned above, did not provide any guidance as to how to execute the process of offshore outsourcing. Similarly, Gottschalk and Solli-Sæther (2006) provided a model of maturity stages in outsourcing relationships. Their work described how relationships evolve toward maturity through stages (phases), but it did not

provide any guidance regarding the entire process of offshore outsourcing. Despite the very few studies that illustrate the general process of outsourcing and the numerous studies that exist on specific areas of outsourcing, no holistic, systematic, and sufficiently detailed framework exists to guide managers and other stakeholders in the effective execution of offshore outsourcing. As a result, companies attempting to leverage offshore outsourcing may end up spending a large amount of time and money exploring how to execute numerous tasks involved with the various phases of the complex offshore outsourcing process, and many companies may still fail at the end of these efforts. In this complex environment, identifying the most effective ways to develop software through offshore outsourcing requires further research. In our view, this is because there is no systematic framework/model of the offshore outsourcing process that describes the phases of the process in enough detail. Therefore, the offshore outsourcing of software production needs to be researched in depth to generate such a holistic and detailed framework (Nahar et al. 2002; McFarlan and Nolan, 1995; Heeks 1999; Lacity and Willcocks, 2001).

Yet the offshore outsourcing of software production is a risky and complex undertaking, involving several potential obstacles (Yalaho et al., 2004), such as insufficient management knowledge and low intellectual property protection. Globally distributed software production is shaped and challenged by at least the following boundaries (Orlikowski, 2002, p. 255): a) temporal (e.g., various time zones), b) geographic (e.g., multiple global locations), c) social (e.g., many participants engaged in joint development work), d) cultural (e.g., various nationalities and organizational cultures), e) historical (e.g., different product development practices in the client and offshore service provider companies, which emerge gradually and may inhibit successful collaboration), f) technical (e.g., complex products) and g) political (e.g., the client and offshore service provider's diverging interests). Unless all these limitations are addressed simultaneously, offshore outsourcing is likely to fail. Examples of failures abound in the literature on this subject (Heeks, 1999).

Information and communication technology (ICT) can be leveraged to mitigate the risks that the companies face in their offshore outsourcing of software production, thereby speeding up the process. For example, effective outsourcing requires that clients and service providers have an adequate level of common knowledge concerning the components and services offered by the service providers and the products or ICT architectures into which the components will be integrated (Takeishi, 2002). ICT-based training tools leveraging multi-media could be very useful for training the stakeholders (Nahar et al., 2006). The Internet also facilitates the global production and distribution of digitized products and services at low cost (Lyytinen et al., 2001; Nahar et al., 2006; Holsapple and Singh, 2001). People and companies around the world are becoming connected to the Internet because of the availability of fast, inexpensive and easy-to-use ICT.

1.2 Research Problem and Questions

The basic research question addressed in this study is: How can information and communication technologies assist companies in software production through offshore outsourcing? To answer the above question, the following sub-questions are formulated:

1. a) What are the phases in the ICT-supported unified process of offshore outsourcing for software production? b) Which major activities, performance measures and expected outcomes are executed and managed effectively in each phase of the process? and c) Which ICT tools best support these phases in general and each phase in particular?

2. How are the outsourcing relationships between the client and service provider initiated, exercised and managed in offshore software development?

3. What are the key risks of ICT-SUPOO for software production, how are risks created in each phase of the process and which strategies should be taken into account to reduce such risks?

4. What are the critical success factors of ICT-SUPOO for software production, and how do these factors enhance success in the offshore outsourcing process?

This research attempts to provide answers to these questions through a rigorous theoretical and empirical study. In this research, we develop a model for an ICT-SUPOO of software production. This model features a holistic management process that integrates a) the offshore outsourcing process, b) the risk management process, and c) the relationship management process. Rather than optimizing the individual processes, the unified process model considers the interactions between them, thereby solving the problems associated with a lack of understanding of offshore business, a lack of appropriate guidance needed to successfully complete an offshore outsourcing project and a lack of understanding of the challenges associated with each stage in the offshore process. The model is unique for two reasons: it encompasses all the concurrent processes that take place during the actual course of the offshore outsourcing of software production; it also provides a systematic and unified view of all the phases in the main processes. In addition, the process model provides a comprehensive view of the phases and activities involved in the offshore outsourcing of software production.

1.3 The Objectives of the Study

The major objective of this research is to develop a model for ICT-SUPOO for software production and validate it through a multiple-case study that can offer both theoretical and practical value. The major objective has guided the formulation and fulfilment of the following specific objectives:

- To identify, on the basis of the literature review, the outsourcing process, the offshore outsourcing process and the project management approach.
- To deliver a model that may be used as a guideline for implementing an ICT-supported process of offshore outsourcing for software production.
- To empirically explore the process and sub-processes/phases used by companies to execute offshore software production through outsourcing.
- To empirically investigate how the outsourcing software project is managed.
- To empirically explore the risks associated with ICT-supported offshore outsourcing of software production, consider how risks are created and provide strategies/solutions for alleviating such risks.
- To empirically explore the success factors associated with ICT-supported offshore outsourcing of software production and how these factors contribute to success.

This research attempts to realize the above objectives through an in-depth review of literature in the field and a detailed analysis of transaction cost theory as well as a cross-case analysis.

1.4 Motivations for the Research

As offshore outsourcing of software development has become a popular business option, more and more companies are looking for ways to effectively manage the whole process of offshore software development while minimizing the risks and transaction costs. The growth of globally distributed software product development is exponential. The development of online databases, collaborative online tools and other web-based tools (Coleman, 1997; Boulos et al., 2006), different sourcing strategies and co-operation models offers many opportunities for companies to effectively and precisely execute offshore outsourcing projects.

In Finland, the software industry is still relatively small, although it has grown rapidly during the 1990s. Today, the Finnish software industry consists of about 2616 companies (Rönkkö et al. 2007). The companies are mainly owned by their founders and family members, with only minor foreign and external ownership. European companies have lagged behind U.S. firms in the packaged software segment due to small and diverse home markets and a low degree of productization and internationalization (Malerba and Torrisi, 1996; Hietala et al., 2004; Rönkkö et al., 2007).

In addition to the above issues, software development in Finland is very costly. Moreover, like other developed economies, Finland faces a lack of skilled professionals in the software industry. This situation forces Finnish companies to look outside the nation's borders to recruit talent or to outsource their software development activities abroad. Thus, the problem is how to effectively manage the offshore outsourcing process. What are the phases and activities

associated with the process, and how does one execute the entire process successfully?

The author did his M.Sc. thesis on offshore outsourcing and, as a result of the encouragement of his supervisor, Dr. Nazmun Nahar, became greatly interested in pursuing Ph.D. research in the same field with a more defined and large-scale focus. Since 2002, the author has been attending national and international conferences, seminars and workshops on outsourcing/offshore outsourcing on a regular basis. For example, in 2003, the author and his academic supervisor, Dr. Nahar, attended an outsourcing seminar in Tampere. The focus of that seminar was on developing a forum within which Finnish companies could express their fears and concerns. Service providers from India and academics from Finland attended this seminar, answering enquires and correcting all misapprehensions and misunderstandings about offshore outsourcing. During the seminar, a manager of a small Finnish software firm made the following comment:

> "Guys, can you explain to me clearly what are the stages of offshore outsourcing to go through to successfully develop my software abroad? I read all the frameworks and models developed by academics, but unfortunately, I still don't get it. I want something applicable and concrete…"

This comment also prompted the author to pursue an innovative finding that could provide a new contribution to his PhD dissertation and be of practical value to companies involved in the outsourcing business.

One of the goals of this study is to find out how ICT can assist companies in their efforts to conduct software production through offshore outsourcing. Thus, in this dissertation, the author develops an all-encompassing model that provides a holistic view and detailed guidance to novice and/or experienced managers about the processes involved in offshore outsourcing. This work may help Finnish and other companies efficiently analyze, choose and collaborate with offshore software companies and successfully execute offshore software development.

1.5 Scope of the Study

The focus of this study is defined by the following boundaries:

1. This study focuses on the investigation of the ICT-SUPOO of software production, the phases and the activities involved in the process, critical success factors, factors that create risks and ways of managing risks encountered and relationship management.

2. In this study, the investigation has been restricted to those ICTs that have the potential to make a large contribution to (i.e., to support and improve) the offshore outsourcing process.

3. The main focus of this study has been to extensively examine how and why ICTs have been used in offshore outsourcing.

4. The study does not deal with IT outsourcing or business process outsourcing.

5. The study deals only with the small and medium-sized client and service provider companies involved in offshore software development.

1.6 Relationship of the Included Articles

This dissertation adopted the collection of articles approach. As such, it contains five articles focusing on the research objectives that look at different aspects of the basic research question. The relationship between the articles and the structure of this dissertation is shown in Figure 1. A conceptual model for the ICT-SUPOO of software production is developed in Article I. In Article II, the ICT-SUPOO of software production model is validated through a review of the vast extant literature, utilizing transaction cost theory in great detail and conducting a cross-case examination from both the service provider and client viewpoints, where professionals with extensive experience in managing the offshore outsourcing of software production are interviewed. In Article III, we look at the specific relationship between a client and its service provider.

The core focus of Article IV is the risk management aspect of the ICT-SUPOO model for software production. In this article, a cross-case analysis is carried out from both the service provider's and client's viewpoints and professionals with extensive experience managing the offshore outsourcing of software production are interviewed. Finally, in Article V, the success factors associated with the ICT-SUPOO model are investigated in detail through a cross-case analysis from both the service provider's and client's viewpoints.

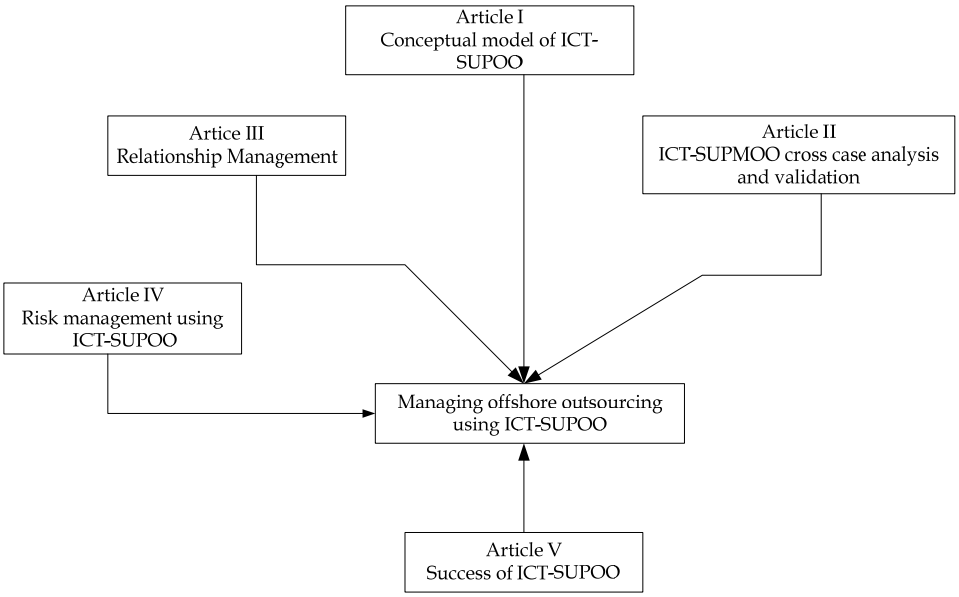


FIGURE 1 Relationship of the included articles

2 WHAT IS INFORMATION AND COMMUNICATION TECHNOLOGY- SUPPORTED OFFSHORE OUTSOURCING

In Section 2.1, outsourcing and offshore outsourcing are presented, and earlier models and frameworks for outsourcing and offshore outsourcing are described. A definition of ICT, the effects of ICT on offshore outsourcing and the capacity of ICT are discussed in Section 2.2. Finally, to further familiarize the reader, a summary of this chapter is given in Section 2.3.

2.1 What is Outsourcing and Offshore Outsourcing?

Outsourcing as a business tool used to meet organizational IT needs is a growing practice in the field of information systems. According to Hindle (2002), outsourcing has continuously increased since the Second World War and has grown exponentially in popularity during the 1990s. According to his estimate, in 1946 only 20 per cent of a typical American manufacturing company's value-added in production and operation came from outside sources; fifty years later, progress from outsourcing has tripled in percentage. Furthermore, Aalders (2001) has observed that outsourcing is a proven business process. During the last 50 years, companies have outsourced all sorts of businesses, ranging from advertising, legal services and fleet management to building maintenance and production. Therefore, Aalders has concluded that outsourcing is not new. Nevertheless, outsourcing in the IT sector is fundamentally different, because it pervades the organization. It is interrelated with almost all organizational activities. It is strategic (Hirschheim, 2006).

Outsourcing was the business model used by Electronic Data Systems (EDS) to supply 'turnkey' information technology services for more than a decade. However, it was a watershed moment when the Eastman Kodak deal in 1989 was first given the name 'outsourcing' (Hirschheim, 2006). Eastman

Kodak, in a deal that attracted industry-wide and media attention, outsourced to three outside firms the management and operation of its data center, its desktop computing support, and its related network requirements support (Hirschheim, 2006). Outsourcing spread speedily, not only in the United States (where it originated), but also throughout Europe, Australia, and Asia.

In this study, offshore outsourcing refers to a commercial arrangement wherein a service client entrusts a foreign service provider with a commission to produce software products or services.

2.1.1 Historical background, trends and practice of offshore outsourcing

The historical roots of IT outsourcing can be traced to the 1960s, when computer systems were physically bulky and large. Such mainframe computers were used for time-sharing services (Corbato et al., 1992; Lee 1992; Lee et al., 1992; Apte et al., 1997; Cohen, 2003; Campbell-Kelly and Carcia-Swartz, 2008; Harindranath and Dhillon, 1997). Time-sharing here means "several persons making use of the computer at the same time" (Corbato et al., 1992, p. 31). The expensive nature of such systems led many organizations to contract out routine data processing activities to large externally managed operators. The arrangement came to be known as facility management. The underlying motivation for businesses to outsource during this period was cost reduction. The 1970s ushered in rapid progress in software and applications development, with huge associated costs. Many organizations could not meet these demands; as such, they had to resort to contract programming as a cost-effective measure.

The period from the 1980s to the present offers a multitude of reasons for the spread and growth of outsourcing and offshore systems development. The importance of the software business and industry for the world economy has received increasing attention. For example, Quinn et al. (1996, pp. 1-3) state:

> "A revolution is now underway. Most innovation occurs first in software. And software is the primary element in all aspects of innovation from basic research through product introduction:
>
> - Software provides the critical mechanism through which managers can lower the costs, compress the time cycles, and increase the value of innovations. It is also the heart of the learning and knowledge processes that give innovations their highest payoffs.
>
> - In many cases, software is the core element in process innovations or increasing the functionalities that make products valuable to customers. In others, software is the product or service the customer actually receives.
>
> - Software provides the central vehicle enabling the inventor-user interactions, rapid distribution of products, and market feedback that add most value to innovations. Consequently, customers and the software itself make many inventions the company's technologists, acting alone, could not conceive".

Software has become one of the largest and fastest growing industries in the world up to the present. Software development costs have risen significantly within organizations as systems have been introduced into every facet of business life, and growing Internet use has created a new set of IT

requirements. New software engineering techniques have evolved to cope with this mass of application development work—structured analysis and design, computer-aided tools, object-oriented programming and software components. As the amount of software development work continues to rise, these new techniques have opened up the possibility of modularizing (Tully, 1993; Baldwin and Clark, 2000; Hietala et al., 2004; Van Assche, 2006) application development work to be carried out offsite, possibly in another country.

Overall, the competition has intensified and the market size of the telecom and IT sector increased significantly in recent years. This has led to the second growth of outsourcing with the emergence of the application service provider (ASP) business model in the 1999s (Hirschheim, 2006). The ASP business model consists of buying, installing and managing enterprise applications remotely through the Internet or via network (Bartholomew, 1998; Anderson, 1999; Susarla et al., 2003; Aspray et al., 2006). As outsourcing has evolved, it has gotten more complex (King 2005), from one to one (one vendor to one client) arrangements in which vendors provide essentially all services to one client, to complex arrangements involving multiple clients and vendors (Chaudhury et al., 1995; Rao et al., 1996; Kern and Blois, 2002).

The third growth of outsourcing was characterized by the back-sourcing trend, where companies unsatisfied with or at the termination of their current contract would pull the outsourced function back in-house (Hirschheim, 1998; Overby, 2003; Veltri and Saunders, 2006).

Fourth, the dire economic conditions of the 1980s and 1990s, which several organizations in the developed economies encountered, hastened the process of global IS/IT outsourcing. This is because cost-saving measures became prominent issues for management facing intense competition locally and internationally. The need to look for competent and skilled foreign professionals capable of delivering quality IT services/products at a fraction of home market prices became the norm. Many firms jumped on the bandwagon of global IS/IT or offshore outsourcing (Lacity and Hirschheim, 1993b; Thibodeau, 2003; Pfannenstein and Tsai, 2004; Vijayan, 2004; Yalaho et al., 2004; Zatolyuk and Allgood, 2004). Lastly, the availability of new software-exporting nations, some possessing entrepreneurship and trading abilities, quickened the practice (Bhatnagar and Madon, 1997; Rajkumar and Mani, 2001; Carmel, 2003b). Examples of such nations include Ireland, Israel, India, China, Hungary, Romania, Russia, the Philippines, Bulgaria, Nigeria and others. Although many developing nations currently serve as the recipient countries for systems development projects, India leads the pack in this regard. The Indian software industry is one of the fastest-growing industries (Taylor, 1996; Athreye, 2005; Kobayashi-Hillary, 2005a; Kobayashi-Hillary, 2005b; E-CommerceTimes, 2007; EconomicTimes, 2007).

In fact, the taxonomy of the world's leading software-exporting nations classifies India in the same group/tier as those of most OECD countries engaged in software production and export (Carmel, 2003a).

2.1.2 Offshore outsourcing models

The business model for offshore outsourcing comes with a variety of options to match client needs with regard to control and ownership. The different types of offshore outsourcing arrangements include the following (see Figure 2): onshore, near-shore, pure offshore, captive center and inshoring.

Onshore can be tantamount to domestic outsourcing. However, onshore outsourcing strategy is often used by offshore service providers to locate separate entities in the same country where the client is located. Three situations are possible: first, the offsite location, where the work is done in the same country as the client, but in a different city or place; second, the onsite location, where all the processes are executed at the client's premises; and third, where the onsite location does part of the work but the actual software coding activities are inshored to the service provider's headquarters which usually are located in a low cost country (Erber and Sayed-Ahmed, 2005).

Near-shore is "when the location of the first destination is at a closer proximity to the country of origin" (Erber and Sayed-Ahmed 2005, p. 100). The term near-shore points to the proximity of the offshore location. This proximity helps to mitigate certain problems, such as time differences, coordination, cultural differences and communication problems that are characteristically associated with offshore outsourcing (Rao, 2004). For example, most Scandinavian countries like to outsource to Russia because of its proximity and compatibility with Western culture. It is for the same reasons that Unites States near-shores to Canada.

In ***pure offshore outsourcing*** the main delivery capacities are located in the service provider country (offshore), which is different from the client's country. The objective is to leverage cost effectiveness with comparable content delivery. Offshoring can occur with reference either to the production of products or to services rendered (Erber and Sayed-Ahmed, 2005, p. 100).

Captive center is the so-called do-it-yourself method. In this mode, a company goes into the offshore country to create a clone company to manage its own offshore activities. This strategy was initially used by big companies that already had physical presences in offshore countries (Vashistha and Vashistha, 2005).

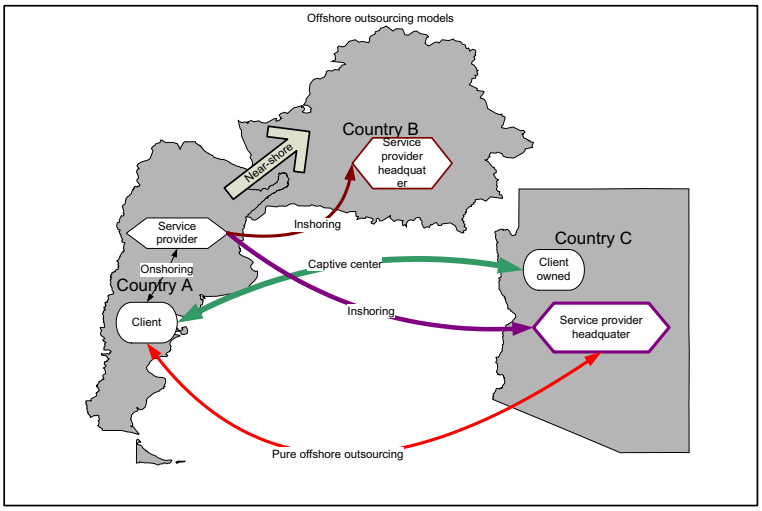


FIGURE 2 Offshore outsourcing models, adapted from Erber and Sayed-Ahmed (2005)

A study by Carmel and Agarwal (2002) noted that the offshore outsourcing, or the offshoring phenomenon, is maturing and that companies are now offshoring their core software development, with a proactive strategic focus on multiple sources of competitive advantage, including innovation, world-class talent, and skills. Sparrow (2003, p. 1) states that the "use of offshore services offers the potential for significant cost savings, but also brings increased risk of problems in communications, quality management and control".

Inshoring "refers to the relocation of business processes (software development activities) from higher-cost to lower-cost countries, taking the view of the destination country" (Erber and Sayed-Ahmed 2005, p.100).

2.1.3 A review of previous prescriptive models of outsourcing and offshore outsourcing

Gottschalk and Solli-Sæther (2006) present a conceptual maturity model for IT outsourcing relationships. Their work is based on organizational theories and outsourcing practices, and through it they have identified the cost stage, the resource stage and the partnership stage as the stages of maturity in outsourcing relationships. According to them, first the relationships focus on economic benefits; then there are concerns about access to competence; and finally the development of norms and alliance management become the main focus. For each stage, they have suggested benchmark variables. Gottschalk and Solli-Sæther have suggested that a long-term IT outsourcing relationship will shift focus as it matures. Their work is a theory-based stage model that has implications for managers in their attempt to understand their current and desired situations with regard to outsourcing relationships. This work is solely devoted to the maturity of outsourcing relationships and does not provide a detailed account of how the outsourcing/offshore outsourcing process evolves.

de Boer et al. (2006) have developed a prescriptive model that provides effective guidance in the early stages of the outsourcing processes while taking into account the decision-makers' bounded rationality. They have provided a summary of existing prescriptive decision models for outsourcing based on a literature review, discussing and explaining discrepancies from the point of view of the literature on bounded rationality and satisfaction. Thus, they contrasted these models with empirical accounts of outsourcing, including two case-studies of the outsourcing of logistics activities. As a result, they developed a conceptual decision model based on the principles of satisfaction. According to de Boer et al. (2006) there appear to be discrepancies between many of the prescriptive outsourcing models in the literature and the processes observed in practice. Their concept of satisfaction provides a useful explanation of these discrepancies and useful design principles for developing more realistic prescriptive outsourcing decision models. They stated that their model constitutes a first step and that its details must be worked out and investigated in more detail. The model offers the basis for realistic decision-making in outsourcing processes. However, it does not provide detailed guidance on how to execute all the phases of offshore outsourcing; rather, de Boer et al. (2006) presented a prescriptive outsourcing decision model.

McIvor's (2000) practical framework for understanding the outsourcing process has addressed a wide array of related subjects, ranging from the supply chain management perspective to the process of carrying out the outsourcing function. McIvor's work identifies four stages in carrying out outsourcing. These four stages define the core activities of the business and evaluate the relevant value chain activities, the total cost analysis of core activities and relationship analysis. McIvor (2000, p. 29) defines the core activities of the business by saying that "a core activity is central to the company successfully serving the needs of potential customers in each market. The activity is perceived by the customers as adding value and therefore being a major determinant of competitive advantage". He stated the importance of the complex task of identifying the organizations' core business activities and non-core activities. The core competence paradigm is based on the companies' understanding of what internal skills and resources they should own and control through internal contracts in order to sustain their business success. In addition to core competences, the organization must also first perfectly understand every possible aspect of the business—essentially evaluating the relevant value chain activities. This endeavour is concerned with analyzing the competencies of the company in these core activities in relation to potential external sources. This stage includes two sub-stages: namely, evaluating the relevant value chain activities and doing a total cost analysis of the core activities. The third stage, total cost analysis of core activities, involves attempting to measure all the actual and potential costs involved in sourcing the activity—internally or externally. This analysis includes all the costs associated with the acquisition of the activity throughout the entire supply chain and not just the purchase price. The fourth stage, relationship analysis, is thought of as a strategy for companies to use in order to exploit the capabilities

of suppliers through the establishment of partnerships or strategic alliances. In all, McIvor's framework is more of a decision analysis tool that covers some specific stages of outsourcing. Perhaps this is due to the fact that it is targeted toward addressing the concerns of the supply chain field. The framework neither gives holistic detail on how to conduct and manage the entire process of outsourcing nor integrates the service provider perspective.

Momme (2002) has developed a framework for outsourcing manufacturing. The strategic and operational implications of this framework were one of the important steps toward identifying and defining the entire process of outsourcing. This framework was developed building on the work of Johnson (1997), who posited that six phases must be accounted for in order to appropriately define outsourcing: strategic analysis, identifying the best candidates, defining the requirements, selecting the providers, transitioning the operations, and managing the relationship. Greaver II (1999) stated that successful outsourcing involves seven phases: planning initiatives, exploring strategic implications, analyzing costs/performance, selecting providers, negotiating terms, transitioning resources, and managing relationships. Lonsdale and Cox (1998) have suggested the following six phases: assessment of criticality of business activity, assessment of supply market, selection of appropriate types of supplier relationship, supplier selection, supplier management, and re-tender or return in-house. Momme's framework synthesized the phases of the entire outsourcing process into strategic planning. The framework includes a logical sequence of key activities with built-in performance measures and expected output for each of the phases. These phases are viewed from the operational standpoint and are listed sequentially as: competence analysis, assessment and approval, contract negotiation, project execution and transfer, managing relationship, contract termination. The author of the present study supports Momme's work because it highlights all the generic phases and, for each of them, a varying number of key decision variables. However, Momme's (2002) framework has some limitations. Like authors (Johnson, 1997; Lonsdale and Cox, 1998; Greaver II, 1999) that Momme cites, they views relationship management as a phase that comes after project execution and transfer. The experience is the same as in the dating process, where the relationship starts from the first meeting and then possibly progresses toward marriage after several other successful meetings, or—if the meetings fail (indicating an improper match between the two parties)—there is a separation instead of a union. The author argues that relationship management is not a static activity; rather, it is an evolving activity that spans many other phases. It starts from service provider selection and runs through contract negotiation and project implementation; then, the contract may terminate or continue to another level if renewed. Moreover, risks identification and management activities are not formally addressed in Momme's framework. Therefore, further work is required to address theses issues. Finally, Momme's framework solely addressed the issues of outsourcing; in offshore outsourcing in particular, many other complex issues are involved and need to be addressed as well.

A model for the outsourcing decision process developed by Tayles and Drury (2001) has dealt with the shift from make versus buy in relation to strategic sourcing. According to them, besides cost and profitability considerations, sourcing decisions also involve issues of thoughtfulness of strategy, detailed financial evaluation, efficiency, and risk dimensions relating to supplier quality, lead times, and delivery reliability. Tales and Drury (2001) have developed a model called the "sourcing decision model" and have validated it empirically through a product engineering case study. Their model provides a step-by-step process that has to be followed before one arrives at the final decision to insource or outsource. These steps are: analysis and determination of the strategic nature of the product or process, analysis of the cost of make vs. buy capital spending analysis, internal resources assessment, and external supplier. The model ensures that the company's strategy regarding capital allocation is followed unless there are exceptional reasons for tactical deviation. Tales and Drury empirically found that the model contributed to more effective decisions and performance improvement through greater efficiency of in-house manufacturing. The model created an awareness of some of the technical aspects of the decision, such as costing systems, which are now clearly understood. They acknowledge that there are some limitations of the model when it is applied in a complex and dynamic environment. Among these are: the availability of new suppliers, the self-interest of the players, the cost approach used, dealing with the move from make to buy, and tactical retention. In addition, the move from outsourcing to offshore outsourcing creates an even more dynamic and complex environment, which is not addressed in the Tales and Drury (2001) model.

Franceschini and Galetto (2003) have developed guidelines for a structured outsourcing process in accordance with the principles of total quality management. The approach is supported by different decision and analysis tools like benchmarking techniques and multiple criteria decision-aiding methods. Their model is organized around four main steps: internal benchmarking, external benchmarking analysis, contract negotiation, and outsourcing management. The above steps are further split in sequence. Within internal benchmarking analysis, the client monitors processes, analyzes efficiencies, and determines what to outsource. The external benchmarking analysis is more focused on the relationship between the client and the service providers, from their selection to strategic relation management. The contract negotiation is the result of the previous analysis and decision. Finally, the outsourcing management consists of the realization of the planned outsourcing process. In such a context, the benchmarking and multiple criteria decision-aiding techniques are suitable. Their model is of great value once outsourcing has been undertaken because it enables the monitoring of performance. The first stage is common within most of the outsourcing literature.

Fill and Visser (2000) have developed a composite outsourcing decision framework. The framework consists of three main components: contextual factor analysis, strategy and structural analysis, and activities cost analysis. The first seeks to develop the unique contextual factors associated with each

decision, the second considers the strategic implications of deciding to outsource, and the third investigates the traditional cost aspects. In the first stage, contextual factors (both internal and external) should be considered; these can be either quantifiable or non-quantifiable criteria. Quantifiable criteria are costs that increase over fixed costs investments and revenues. Non-quantifiable criteria are strategic interest, confidentiality, linkage with operations, the stability of employment, management and dependence on suppliers. All these factors are judged by adding the score for both the external and internal factors; the total score will indicate if outsourcing is the best strategy. The second part of the framework deals with the consideration of the strategic and structural dimensions. A qualitative guideline with nine questions may help companies to consider the structural aspects associated with the decision and focus on how integrated the organization should be. The questions consider, for example, how unique the products are, how much capital the products will require and the suppliers' capacity and competence. The third element of the model, which concerns costs, is examined by cost analysis activities. Two types of cost are considered: production cost and coordination or transaction costs. Fill and Visser's framework provides guidance for pre-outsourcing activities. It is a decision analysis tool that does not provide a holistic view of how the entire outsourcing process should be executed.

Probert (1996) has developed a model that deals with make-or-buy decisions. It aims to provide a graphical representation of why make-or-buy decisions are made and to show relevant dimensions to be studied in approaching make-or-buy decisions.

Probert's (1996) model begins the analysis of the external environment by looking at political aspects, social factors, the availability of suppliers, and competition from other suppliers. The company has little or no influence over these elements, activated triggers for the make-or-buy analysis. The triggers are reasons for undertaking the make-or-buy review and can easily be identified by asking why the decision is being made. Examples of trigger factors are cost reduction, higher quality and new product characteristics, which lead to the question of whether the company should buy from an external supplier or make internally. The model consists of four main areas that should be compared and evaluated during the sourcing decision: technology and manufacturing processes (technology and equipment, skills necessary to perform and support the process), costs (production cost and acquisition cost), supply chain management and logistics (choice of supplier, collaboration with suppliers, and time to delivery), and support systems (quality and information systems and technical service). Probert's (1996) model points out the importance of cost accounting and that the decision should be followed up after some time.

Sink and Langley (1997) developed a managerial framework on the logistics services purchasing process. The framework consists of five distinct phases: a) defining the need to transfer logistics services to external suppliers— the perception of the problem, the management's agreement, the composition of the negotiating committee, and cooperation with the management of business

units; b) the elaboration of feasible alternatives—inclusion of internal specialized knowledge and experiences and of external specialists; c) the evaluation of candidates and selection of suppliers—the preparation of criteria for selection, the collection of all the necessary data, the evaluation of the candidates, the selection of the supplier; d) the implementation of service—making a plan for the transition to outsourcing, education, and the transfer of services to the external supplier; and e) ongoing service evaluations—qualitative and quantitative evaluations of the level of services, control over the realization of services and their improvement, and the improvement or shifting of the external suppliers. Sink and Langley (1997, p. 178) stated that:

> "[C]andidate evaluation begins with the establishment of selection criteria. Quality, cost, capacity, and delivery capability are used to evaluate distribution providers. In selecting an external logistics provider, however, the criteria are typically more rigorous. References provided by current customers, cultural compatibility, financial strength, depth of management expertise, operating and pricing flexibility, and information system capabilities play essential roles".

The first stage of Sink and Langley's (1997) model, the identification of the core activities of the business, is common within most of the outsourcing literature. However, one important facet of the Sink and Langley model is that it does not have a feedback loops between steps. Moreover, the model has embedded control tools that emphasize relationship management. Perhaps this is due to the specificity of the logistic field.

Carmel (2002) developed a maturation model of offshore sourcing for IT work. In his study, offshore IT sourcing was identified as a maturation process. The author proposed four stages in the model, called SITO. The first is offshore bystander; in this stage, there is no offshore sourcing of IT work. Domestic outsourcing is only used. In the offshore experimenter phase, experimentation begins. Sourcing is done on ad-hoc basis. In the proactive cost focus phase, cost efficiency is the driver; sourcing centers perform non-core activities (support, enhancements). According to Carmel, more organizational structures emerge to manage offshore activities and awareness of offshore is diffused. The final stage is the proactive strategic focus; at this stage, organizations begin to strategically look at sourcing as a source of competitive advantage, providing innovation, world-class talent and skills. Sourcing centers perform core corporate activities, including new systems and products. Carmel's model provides many insights on the category of firms and their sourcing practice. However, the maturation model does not provide any guidelines on how to execute the process of offshore outsourcing. Instead, the model describes organizations' activities regarding sourcing and classifies them as mature or immature in their use of the sourcing business model.

Yalaho et al. (2004) also developed a framework. The framework was built on Momme's (2002) work. The framework consists of seven distinct steps or phases. Although Yalaho et al. (2004) have adapted the work of Momme (2002) to make it suited to the process of offshore outsourcing, their study has some limitations. The risk identification and management element was almost

entirely missing, except in one or two phases. Relationship management is one phase in the process of offshore outsourcing and starts just after project implementation. Therefore, further research is required to address the issues associated with offshore outsourcing.

2.2 Information and Communication Technology

ICT is a highly dynamic technology. ICTs are seen as supporting new organizational working practices (Malone et al., 1987; Moshowitz, 1997). The exchanges of ideas and flexibility enabled by new ICTs have led to innovative products or services and speedier responses to change, giving the new network organization a considerable advantage in the global market.

Before the convergence of personal computing, telecommunications, the internet, and television into a single technology platform, IT referred to stand-alone information systems. However, in more recent information systems literature, the terms IT and ICT are used interchangeably. For example, Nahar (2001, p. 42) defined IT as :

> "[M]odern computing with multimedia capability computing networks and communications technologies; their development, implementation and provision of technical support; and their application for data processing, storage, sharing, and transmission. All information may be in the same place, or different places, within the same time frame or different time frames".

Meyer (1997) defined information and communication technology as hardware, software, telecommunication technology, human skills and intellectual expressions. This includes data, knowledge, and language in all digital, print, audio, and visual formats.

Another definition, published by Wikipedia (2008), called ICT :

> "An umbrella term that includes all technologies for the communication of information. It encompasses: any medium to record information (whether paper, pen, magnetic disk/ tape, optical disks - CD/DVD, flash memory, etc.); and also technology for broadcasting information - radio, television; any technology for communicating through voice and sound or images- microphone, camera, loudspeaker, telephone to cellular phones".

According to Maier (2004), ICT tools and systems are technologies that provide sophisticated functions for the publication, organization, visualization, contextualization, search, retrieval, and distribution of knowledge as well as functions supporting communication, cooperation and the linkage of individuals in networks at comparably low cost. However, this definition assumes a knowledge management perspective on ICT.

In this study, ICT refers to technologies that provide sophisticated support or enabler functions, such as hardware and software, computing networks and communications technologies; tools and technologies that provide technical

support; and their applications for data processing, storage, sharing, and transmission. This includes any medium for recording, retrieving, and distributing information.

2.2.1 Effects of information and communication technology on offshore outsourcing

The success of offshore outsourcing is closely related to the diffusion, availability, and decreasing cost of ICT. ICT is vital for modern firms in general and for global software companies in particular. Today, a primary business trend is the use of ICT to decrease costs and increase capabilities (Malone and Crowston, 1994). In addition, ICT augments businesses' ability to coordinate business transactions within the firm, nationally, and internationally—and also helps firms that have a client-service provider relationship with one another. Various effects of ICT contribute to the reduction of transaction and coordination costs:

1. **The communication effect:** Advances in information and communication technology allow for more information to be communicated in the same unit of time, thus reducing transaction costs (Malone et al., 1987).

2. **The electronic integration effect**: Tighter electronic linkage between service provider and client is enabled (Malone et al., 1987).

3. **The electronic brokerage effec**t: An electronic marketplace is created where client and service provider come together to compare offerings (Malone et al., 1987).

4. **The electronic strategic networking effect:** Information and communication technology enables the design and deliberate strategic deployment of linkages and networks among cooperating firms; these are intended to achieve joint, strategic goals and help firms gain a competitive advantage (Wigand and Benjamin, 1996).

5. **The managerial effect:** Information and communication technology enables managers to search for and retrieve information as well as distribute and monitor tasks regardless of location and time at low cost. Such technology also enables new forms of organization such as virtual organization, networked organization, and so forth (Mowshowitz, 1997; DeSanctis and Monge, 1998; Chutchian-Ferranti, 1999)

2.2.2 The capacity of information and communication technology

Research has demonstrated that key to success is a good understanding of the capabilities of ICT, its impact on an organization, and its effect on business processes (specifically, the offshore outsourcing process) (Yalaho et al., 2008;

Nahar, 2001). The characteristics of ICT listed below show in which capacities it can improve the offshore outsourcing process for software development. Each capacity of ICT has positive impacts on organizations (Davenport and Short, 1990; Nahar, 2001):

1. **Transactional:** ICT can convert amorphous processes into routine transactions.

2. **Geographical:** ICT can surmount the distance barrier such that processes become independent of location.

3. **Automational:** ICT can remove or lessen human labor in the process.

4. **Analytical:** ICT can simplify a complex analytical method into a less complex method.

5. **Informational:** ICT can convey limitlessly detailed information in a process.

6. **Sequential:** ICT can execute multiple tasks at the same time.

7. **Knowledge management:** ICT enables the collection and dissemination of knowledge and expertise to improve the process. Maier (2004) stated that ICT tools and systems can offer complex features and functions for the publication, organization, visualization, contextualization, search, retrieval, and distribution of knowledge.

8. **Tracking:** ICT enables the precise tracking of task status, inputs, and output in the process.

9. **Disintermediation:** ICT can facilitate and help maintain the relationship between two parties within a process and remove the need for a broker or an intermediary.

ICT has the capacity to support and improve the process for the offshore outsourcing of software development. The capacities of ICT are classified within the context of offshore outsourcing; Yalaho (2006) elaborates on the ways in which they can improve the process.

2.2.3 The information and communication technology support to offshore outsourcing'

The ICT support means that it facilitates the ability of individuals, groups, organizations, and communities to execute activities, processes, etc. ICT has the ability to increase capacity and decrease the cost of searching, processing, storing information, and communicating (Nahar, 2001; Nooteboom, 1993; Bakos and Brynjolfsson, 1993); ICT also provides the infrastructure that can be used to support administrative activities, business processes, and the operational skills

of a staff. In addition, it adds strategic value to organizations. The nature of the work and the process of production have changed drastically (Malone et al., 1987; Moshowitz, 1997; Maier, 2004), and employees are spread across several work sites, geographical locations, and time zones rather than being centralized in one office. This is possible due to the support of ICT.

2.3 Summary

Our review of relevant prescriptive models above identified some similarities (see Table 1). These findings are in accordance with the work of de Boer et al. (2006, p. 445), who argued that:

> "[M]ost models basically consist of a limited number of steps. Common aspects – although not necessarily appearing in similar steps and/or in all models – are: a) definition of core competences and strategy, b) assessment of integral costs, and c) analysis of suppliers and competitors".

The relevant models reviewed have distinctive differences; there are those that prescribe a top-down analysis of activities and those that assume that an activity has already been identified (de Boer et al., 2006). All these models emphasize the awareness of needs as the starting point of the process. However, Sink and Langley (1997), Momme (2002), Yalaho et al. (2004) and Franceschini and Galetto (2003) to some extent emphasize process issues such as needs identification, top management commitment, the formation of cross-functional buying teams, the development of selection criteria, and service implementation. Bagchi and Virum (1998) also emphasize process, but their framework is wider in scope, dealing with post-contracting issues such as performance measurement and goal redefinition. When these models are taken as a whole, one sees that some models assume that the buyer is responsible for service definition and also extend to post-contracting issues such as service implementation and performance measurement.

Information and communication technologies are seen to be the key enabler of the offshore outsourcing of software development. ICTs have an impact on_geographically dispersed organizations because they eliminate the distance constraints on economic activities. ICTs augment organizational capabilities by coordinating business transactions within the firm, nationally, and internationally, and also in business relationships such as that between client and service provider. Various effects of ICTs have contributed to the reduction of transaction and coordination costs. ICTs have changed the nature of the work, and the processes of production have changed drastically. Individuals, as employees, are spread across several work sites, geographical locations, and time zones rather than being centralized in one office. This is possible due to the support of ICT.

TABLE 1 Relevant prescriptive model adapted from de Boer et al. (2006)

Author (s)	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
Probert (1996)	Data collection	Derive business issues	Technology and product definition	Definition of subsystem (e.g. in case of product family)	Develop strategies for technology cost model	Matrix positioning against competitor	Develop strategy recommendations and implications
Sink and Langley (1997)	Defining the need for transferring logistics services onto external suppliers	Elaboration feasible alternatives	Evaluate candidates and select supplier	Implement service	Ongoing service evaluation		
Bagchi and Virum (1998)	Establish objectives and selection criteria	Identify qualified providers and articulate needs	Evaluate bidders and select a partner	Develop an integration Plan	Managing relationship	Measure and analyze performance	Redefine goals and objectives
McIvor (2000)	Defining the core activities of the business	Evaluate the relevant value chain activities	Total cost analysis of core activities	Relationship analysis			
Fill and Visser (2000)	Contextual factors analysis	Strategy and structural analysis	Activities cost analysis	Management and evaluation	Outsourcing		
Tayles and Drury (2001)	Analysis and determination of strategic nature of product or process	Analysis of cost of make vs buy	Capital spend analysis	Internal resources assessment and external supplier			
Momme (2002)	Competence analysis	Assessment and approval	Contract negotiation	Project execution and transfer	Managing relationship	Contract termination	
Franceschini and Galetto (2003)	Core competencies evaluation	Identification of processes to be outsourced	Choosing type of relationship	Outsourcer selection	Service level agreement	Temporal evolution	Management of the outsourcing process
Carmel (2002)	Offshore bystander	Offshore experimenter	Proactive cost focus	Proactive strategic focus			
Yalaho et al. (2004)	Strategic analysis and decision	International market research and promotion	Selection of providers	Contract negotiation	Project implementation	Managing relationship	Evaluation and contract termination

3 THEORETICAL BACKGROUND

In this chapter, we analyze and discuss in great detail the constructs of transaction cost theory that are relevant to both clients and service providers in the offshore outsourcing of software production. The economic factors include: a) assembling information, b) uncertainty, c) frequency, d) bargaining, e) assets specificity, and f) monitoring performance; the behavioural factors include: a) bounded rationality, b) opportunism, and c) environment.

In past research, various theoretical lenses have been used to explain IS or IT outsourcing. Some of the theories used include: a) transaction cost theory (Beath, 1983; Lacity and Hirschheim, 1993a; Klepper, 1993; McFarlan and Nolan, 1995; Aubert et al., 1996; Ang and Straub, 1998; Bahli and Rivard, 2003; Cannel, 2005), b) resource-based theory (Conner, 1991; Grant, 1991; Straub et al., 2000), c) agency theory (Eisenhardt, 1989b; Gomez-Meijia and Balkin, 1992; Croson and Jacobides, 1997; Bahli and Rivard, 2003), d) resource dependency (Kern, 1997; Kern and Kreijger, 2001; Wonseok and Gallivan, 2004), e) cooperation theory (Chen et al., 2005), f) diffusion of innovation theory (Yalaho and Wu, 2002), g) absorptive capacity theory (Zahra and George, 2002; Matusik and Heeley, 2005), and h) game theory (Elitzur and Wensley, 1997). Lee et al. (2000), building on the work of Cheon et al. (1995), clustered the most-used theories in outsourcing literature into three categories: a) strategic management theories, b) economic theories, and c) social theories. Strategy management theories characterize outsourcing as a means for firms to improve or gain a competitive advantage by making efficient use of resources (resource-based theory). In addition, outsourcing permits firms to gain access to critical resources not available internally (resource-dependency theory, absorptive capacity theory). Economic theories consider outsourcing as a way to manage efficiency, cost, and benefit (transaction cost theory, agency theory). Social theories investigate the interaction between outsourcing clients and service providers to provide an understanding of the formation, ongoing interaction, behavior rationale, and dissolution of outsourcing relationships (game theory).

In this study, transaction cost theory (TCT) (Williamson 1975, 1979 and 1981) is analyzed in depth and utilized to examine the current research

problem. The rational behind the selection of this theory is as follows. First of all, the subject of outsourcing is exposed to many theories, as one can see above. However, the basic assumption is that a firm engages with an outsourcing contract to save on transactions (i.e., to reduce costs in all possible ways). Although many other reasons sustain the motivation to outsource (Lacity and Willcocks, 2001), we posit that the primary reason is economic (Gupta and Gupta, 1995). Second, transaction costs alone can not explain why firms go outside their boundaries to transact (see, e.g., Gupta and Gupta, 1995).

3.1 Transaction Cost Theory

The main goal of an organization is that its economic activities balance production cost advantages with the costs involved in negotiations and market exchange. The seminal work by Coase (1937) expounds on the important dimensions of transaction costs. Transaction costs refer to the effort, time, and costs incurred in searching for, creating, negotiating, monitoring, and enforcing a service contract between buyers and suppliers. TCT, originating from the work of Coase, states that "the main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism" (Coase, 1937, p. 390). However, several decades later, an integrative framework for TCT was introduced by Williamson (1975, 1981, 1985); this framework deals with the formation of "hierarchies". Williamson stated that the nature of the modern corporation is mainly defined in terms of internalizing transaction costs within the organization and achieving savings on these costs, which are linked mainly to contracting costs. Several scholars (Beath, 1983; Lacity and Hirschheim, 1993a; Klepper, 1993; McFarlan and Nolan, 1995; Ang and Straub, 1998; Bahli and Rivard, 2003; Cannel, 2005; King and Torkzadeh, 2008) have stated that TCT provides a theoretical lens for examining and analyzing the IS outsourcing phenomenon. Williamson (1981, p. 568) suggests that "[t]here are so many kinds of organizations because transactions differ so greatly and efficiency is realized only if governance structures are tailored to the specific need of each type of transaction". Williamson goes further to claim that "[t]he economic institutions of capitalism have the main purpose and effect of economizing on transaction costs" (Williamson, 1985, p. 17).

A relationship of exchange between parties creates transaction costs that are mainly engendered by negotiating, monitoring and enforcing contracts and behaviors associated with the exchange. Transaction costs can be usefully thought of as "the economic equivalent of friction in physical systems" (Williamson, 1985, p.19). As friction absorbs energy and reduces the efficiency of a mechanical system, so transaction costs similarly reduce economic efficiency and the potential value of an exchange. TCT predicts that the governance structure that economizes on transaction costs is Pareto optimal (i.e., the hierarchy is sharpened until it is impossible to make one party better

off without making the other party worse off). Internalizing transaction costs within a governance structure, organization does not eliminate transaction costs; instead, it transfers the responsibility for economizing to the organization's managers. When the management of the transaction costs of the exchange within an organization or governance structure is greater than the one within the market, then the exchange will take place in the market. In other words, TCT depends in a basic way on whether an organization uses a provider or develops the same product or service in-house.

Both economic and behavioural influences are given great consideration within the TCT. For example, Williamson (1981) identifies two behavioral factors (i.e., bounded rationality and opportunism) and three economic or transaction factors (i.e., uncertainty, frequency, and assets specificity). However, building on earlier work on TCT, Bowersox and Cooper (1992) posit six key influences on transaction costs. Three factors are behavioural, and three are economic. The behavioral factors, which include bounded rationality, opportunism, and environment, are considered to be more qualitative (because they are difficult to measure or, in the case of behavioral factors, can only be appreciated). The three economic factors include assembling information, bargaining, and monitoring performance and are more likely to be quantifiable in the TCT framework (since quantitative factors are concerned with how many—e.g., how many milestones were successfully completed in a certain time frame—economic factors are therefore measurable). In this study, we analyze and discuss the following constructs that are relevant to both clients and service providers in the offshore outsourcing of software production. The economic factors include: a) assembling information, b) uncertainty, c) frequency, d) bargaining, e) assets specificity, and f) monitoring performance; the behavioural factors include: a) bounded rationality, b) opportunism, and c) environment.

3.1.1 Economic influences on the transaction costs

Assembling information. Information that affects a business transaction is often asymmetrically distributed between the parties to a transaction (Al-Obaidi, 1999). Assembling information can be costly. This process involves searching for exchange alternatives, searching for and identifying a prospective service provider or client, and determining specifically what will be exchanged. In the offshore outsourcing of software development, the offshore project is most often initiated by the outsourcing client. However, more and more service providers are taking the initiative to market their competences and convince their prospective clients to offshore their software development projects to them (the service providers). This is done by first searching for and identifying the high-potential client markets and then sending promotional mailings/circulars to those clients in order to describe the competences and the standards (i.e., CMM1-5, CMMI, SPI, etc.) adopted by service providers. After that, the service providers arrange trade shows, exhibitions, summits, and business meetings

with delegates of various countries to disseminate various relevant pieces of information related to service-providing companies.

Uncertainty. Uncertainty is essentially how difficult it is to anticipate the possible occurrences that may come up during the course of the transaction. The business environment is characterized by uncertain and complex events and situations of significance (Nahar, 2001). Uncertainties such as business cycle instability (i.e., seasonal or cyclical factors), requirement changes, and technological uncertainty will lead to more bureaucratic transactions, given that it is difficult and too expensive to create contracts that will cover probable outcomes.

Frequency. Frequency refers to the number of times the client seeks to initiate the transaction. Frequency has been split into two different concepts, that of occasional (usage) and recurrent (how often the transaction occurs). The first concept refers to the usage rate of information system development functions within the organization. The second concept describes how often a transaction occurs.

Frequency is an important variable in transaction cost theory. It is even more important when it concerns software development activities (Aubert et al., 1996). According to Aubert et al. (1996), frequency "refers to the use of different skills rather than software development project. For a given project, the required skills and their frequency of use must be identified". They found that most firms were sourcing externally for skills that were required sporadically. In another study, Lacity and Willcocks (1995) classified observations of successful outsourcing decisions according to contract types in an attempt to verify the predictions of TCT. They found some significant anomalies in the TCT framework in the sense that some firms had successful contracting arrangements that were not as maintained in the way that TCT predictions and other firms had contracting arrangements per transaction for the relevant types of transactions—but these arrangements resulted in failures. The anomalies were explained as exceptions due to a high degree of uncertainty, a small number of suppliers, language ambiguity, or the difficulty of making the transaction cost variables operational.

Bargaining. After assembling the information and identifying the prospect (a service provider or client), the business may begin bargaining activities. Bargaining activities are concerned with "closing the deal" or securing the proposed service at an acceptable price. The transaction costs include the cost associated with this activity (bargaining) (Coase, 1960; Williamson 1985). Depending on the length and the means of the negotiation, costs can easily rise or decrease. The transaction costs can also rise depending on the number of negotiators. Further, face-to-face communication in this context may be very costly (because it requires more travelling cost), even more costly than negotiating through the use of ICT (e.g., web-phone, email, fax, telephones that are fixed or mobile), especially if the two parties are situated in geographically dispersed locations.

Asset specificity. Asset specificity is the central part of the transaction cost logic developed by Williamson (1975, 1981, 1985). Fundamentally, asset specificity is characterized by very high relationship-specific investments in physical and/or human assets that cannot be transferred to alternative uses. This means that to build successful relationships, one must make transaction-specific investments, that is, put non-marketable assets at risk in order to assure that the relationship will work. However, opportunistic behavior is critical if the asset is part of the transaction. These assets may be plant, software, and hardware assets uniquely devoted to the production of a specific product or to servicing a specific client or providing specific knowledge and expertise. For example, an offshore outsourcing service provider invests massively in specific hardware and software dedicated solely to one client. In due course, the client will be able to pressure the service provider, since the service provider has no substitute use for its investment and will be obliged to accept a lower price. Consequently, a difficult negotiation ensues in which each party tries to take advantage of the other. This creates the need for complicated safeguards that have to be incorporated in the contract. However, when the client owns the equipment, then the incentive to take advantage evaporates, and the cost of creating safeguards is eliminated, since the firm owns its own assets. Asset specificity in the context of offshore outsourcing is described by Cheon et al. (1995, p. 214) "as the uniqueness of the firm's hardware and/or software architectures and skill set of IS employees".

High asset specificity increases dependence and transaction costs. This makes the provider substantially more vulnerable to opportunism and necessitates safeguards. Various dimensions of costs involved in transactions on asset specificity can further be broken into three types: a) site specificity, b) physical asset specificity, and c) human asset specificity. We explain these three constructs below.

Site specificity. This is when a buyer or seller locates its facilities next to those of the other to economize on inventories and transportation costs or improve technical efficiency (Williamson, 1975). For example, most of the Nordic companies prefer to outsource their software production or IT activities to geographically closer providers, such as Russian, Hungarian, Romanian, Czech Republic, Slovakian, and Baltic country providers.

Physical asset specificity. This is characterized by specialized infrastructures that are required to produce a product or service or component. This implies that investments are made in the development of a specialized product or service, or in equipment or tooling designed for a particular client. Williamson (1989) considers asset specificity to be specificity towards a particular client that serves his/her needs. For example, in offshore outsourcing, a provider may invest in upgrading IT infrastructure and/or purchase specialized software development tools and hardware to serve a specific client's need; in this case, the investment is not re-deployable. However, a study conducted by Al-Obaidi (1999, p. 28) shows that "[a]n investment in assets specific to the requirements of a particular transaction… can be

redeployed for alternative uses or by alternative users with a loss of productive value".

Human asset specificity. Human asset specificity is more associated with knowledge. According to Williamson (1981, p. 555), this "arises from learning by doing". Implicitly, this means that one or both of the parties develop skills or knowledge specific to their relationship. According to Williamson, there is difference between necessary and sufficient conditions of human asset specificity. The necessary condition is characterized by the intellectual capabilities of the employees, whereas the sufficient criterion is more concerned with whether the knowledge necessary for the performance of tasks can only be achieved through a 'learning by doing' course of action. For example, Williamson (1981, p. 653) further stated that the "knowledge of a particular firm's filing system, for example, may be highly specific and non-transferable". As a result, the development of this type of knowledge is barely possible in teamwork-oriented organization (Williamson, 1981). That is, it is a source of added value to the employer and employees not to outsource.

International system development (ISD) is a set of highly human-intensive activities in general (Nam et al., 1996). Some functions have a very high degree of human asset specificity, which may lead to specific investments for an offshore service provider. In general, the offshore service provider possesses generic ISD and application domain knowledge but lacks business domain-specific knowledge. To execute the client's tasks the provider needs to acquire company-specific knowledge. Therefore, human asset specificity could be thought of as business domain knowledge and technological domain knowledge.

Monitoring performance. These are the post-transactional activities associated with ensuring that the product/service delivered conforms to the requirements or expectation of the client. The challenge in the exchange market is the complexity in measuring the exchange partner's performances (Poppo and Lacity, 2002). As a result, the market succeeds when there is an effective link between reward and productivity, which means that productivity can be measured and rewarded accordingly (Alchian and Demsetz, 1972). Therefore, the success of these activities (performances measurement) relied on an early well-defined performance measure or metric. Poppo and Lacity (2002, p. 256) stated that "when performance is difficult to measure, parties have incentives to limit their efforts toward fulfilling the agreement". They further explained that in this situation, managers choose between a) realizing lower performance due to their inability to measure performance, and b) putting significant resources to improve performance by creating a complex contract that specifies the delivery level and monitors behaviour of the partner.

However, offshore outsourcing may result in high costs for these reasons: a) the problems with the produced software, b) the limited number of potential and suitable providers and the number of those that are unsuitable clients in the sense that business requirements have not been specified clearly, c) the

potential of creating competitors and opportunistic behaviour exposed by providers, and d) the difficulty of assessing the capability of providers.

3.1.2 Behavioural influences on the transaction costs

Bounded rationality. Bounded rationality refers to the impossibility of making truly rational decisions due to the fact that we cannot assimilate all the information at our disposal and develop appropriate decision rules for every unforeseen event that might occur in our lives (Williamson, 1985). This implies that humans have limited capabilities in terms of receiving, storing, retrieving, assimilating and processing all the information at their disposal. It may lead to incomplete contracts or contractual hazards. As a metaphor, the game of chess best explains this. In a chess game, all the rules that determine the game are known, but no one has the ability to perfectly analyze any given position during the game. The fact is that the game itself is too complex because there are so many alternatives and the actions of one's opponent are unpredictable (De Groot, 1965; Hammond, 2007).

Opportunism. Opportunism deals with the practice or policy used by an economic agent to exploit a circumstance in a self-interested way (Williamson, 1979). In other words, it means that we are willing to purposely deceive our partner to satisfy our own interest. Williamson (1986, 1999) defined opportunism as self-interest with guile. Sako and Helper (1998) stated that trust and opportunism are linked, although they are different concepts. Trust can be affected by a) the length of any past outsourcing relationship, b) the reciprocity in information exchange, c) the provider's ownership of client-specific assets, and d) the level of specific technical assistance provided by the client. In addition, vertical integration is not sufficient to reduce the perception of opportunism on the part of provider. Thus, the client's holding equity from the provider gives rise to varying levels of opportunism or trust depending on the provider's other management techniques (e.g., information sharing, provider suggestions, and technical assistance) that are practiced in specific relationships.

Environmental factors. These include factors that determine the complexity, instability, and variability in the outsourcing manager environment. For example, the specter of a radical technological change can render obsolete the service provider's current project. Williamson (1985) portrays the general changes in the outsourcing manager's environment as "environmental heterogeneity". In general, most outsourcing managers fear instability and volatile change. When such situations arise, they tend to adopt the simplest alternative in order to minimize variation instead of dealing with complexity.

According to Al-Obaidi (1999), transaction costs literature has mainly concentrated on examining the costs aspects, while other impacts of inter-firm cooperation, governance, or control arrangements are not dealt with adequately. Zajac (1993) also stated the lack of attention to behavioural process in the transaction costs approach.

The above theory has aided in the development of a questionnaire guide. It has yielded ideas for looking into various aspects of the case companies and has helped in case examinations, analyses, and descriptions.

4 RESEARCH MODEL

This section explains the development of the research model for the offshore outsourcing of software production (see Figure 3). The model has been developed on the basis of:

a) Key constructs as offered by transaction cost theory, as well as literature on information and communication technology, outsourcing, and the offshore outsourcing of software production.

b) The relationship among the key constructs.

c) The issues to be examined in this research.

In developing the research model (see Figure 3), we did an extensive literature review of the past prescriptive frameworks and models dealing with cost analysis (Cronk and Sharp, 1995; Hancox and Hackney, 2000; King, 2001; Lee and Kim, 1999; Looff, 1995), competence analysis (Looff, 1995; Cronk and Sharp, 1995), supplier influence and associated risks (Aubert et al., 2005), and decision factors of IT outsourcing (Cronk and Sharp, 1995; Greaver II, 1999; Lacity and Willcocks, 2001; Pandely and Bansal, 2004). Through an in-depth literature review, we noticed that very limited research exists on the processes for the offshore outsourcing of software development, meaning that there are a few but not enough descriptive frameworks (Greaver II, 1999; McIvor, 2000; Momme and Hvolby, 2002; Momme, 2001; Yalaho et al., 2005a; Yalaho and Wu, 2002) and that these frameworks may not provide adequate guidelines to a novice or even an experienced manager in offshore software development.

ICTs are crucial for the successful implementation of an ICT-supported, unified process of offshore outsourcing. ICT tools have played, and continue to play, a fundamental role in the development of offshore outsourcing (O'Hara-Devereaux and Robert, 1994; Dibbern et al., 2004). According to O'Hara-Devereaux and Robert (1994, p. 74), "Global (distributed) organizations cannot function without information technology". This also applies to the offshore outsourcing of software development. ICT is the engine of distributed collaborative organization. However, the ability to identify the right technology

to effectively support the offshore outsourcing of software development is the key to success (Yalaho et al., 2008). In Figure 2, in addition to providing electronic interconnectivity, the internet technology provides the virtual marketplace in the global networks where business processes, inter-organization transactions, and market trading take place. TCP/IP provides the uniform transmitting and interfacing standard. The middleware supports the service functions. The web technological platform enables interoperability among disparate, globally distributed, multiple information systems. Interoperability, which "is the ability of two or more software components to cooperate despite differences in language, interface, and execution platform" (Wegner, 1996, p. 285), is the most vital issue facing businesses that need to access information from multiple information systems.

The key players who participate in the offshore outsourcing process are the offshore service client and service provider, shown in Figure 3 (within the rectangle at the both extreme side). Both service provider and client have the capability and experience, strategy and vision, and facilities and infrastructure required to engage in an offshore outsourcing transaction. The rectangular box named "ICT-SUPOO model" illustrates all the concurrent processes, with their ICT support, that are involved simultaneously during the execution of an offshore outsourcing project.

The transaction cost theory (in the rectangular box on the left hand side just before offshore service client) is linked to the offshore service client and offshore service provider through the ICT-SUPOO model. The ICT-SUPOO model works as the management tool that may considerably reduce the transaction cost. The thinner arrows, drawn through the transaction cost theory and the ICT-SUPOO model and directed to both the offshore service provider and the client, represent the information exchanged during the process of offshore outsourcing. The smaller rectangular box below the ICT-SUPOO model illustrates the factors that positively or negatively impact the model.

The external environment, characterized by exogenous risks, is located between the bigger rectangle with the solid line and smaller rectangle. Exogenous risks are events or factors outside the control of the organization. Events or factors external to the project often come as a surprise to the project team and are seen as obstacles to progress. These factors depend on the complexity and dynamism of the environment (Dess and Beard, 1984; Duncan, 1972).

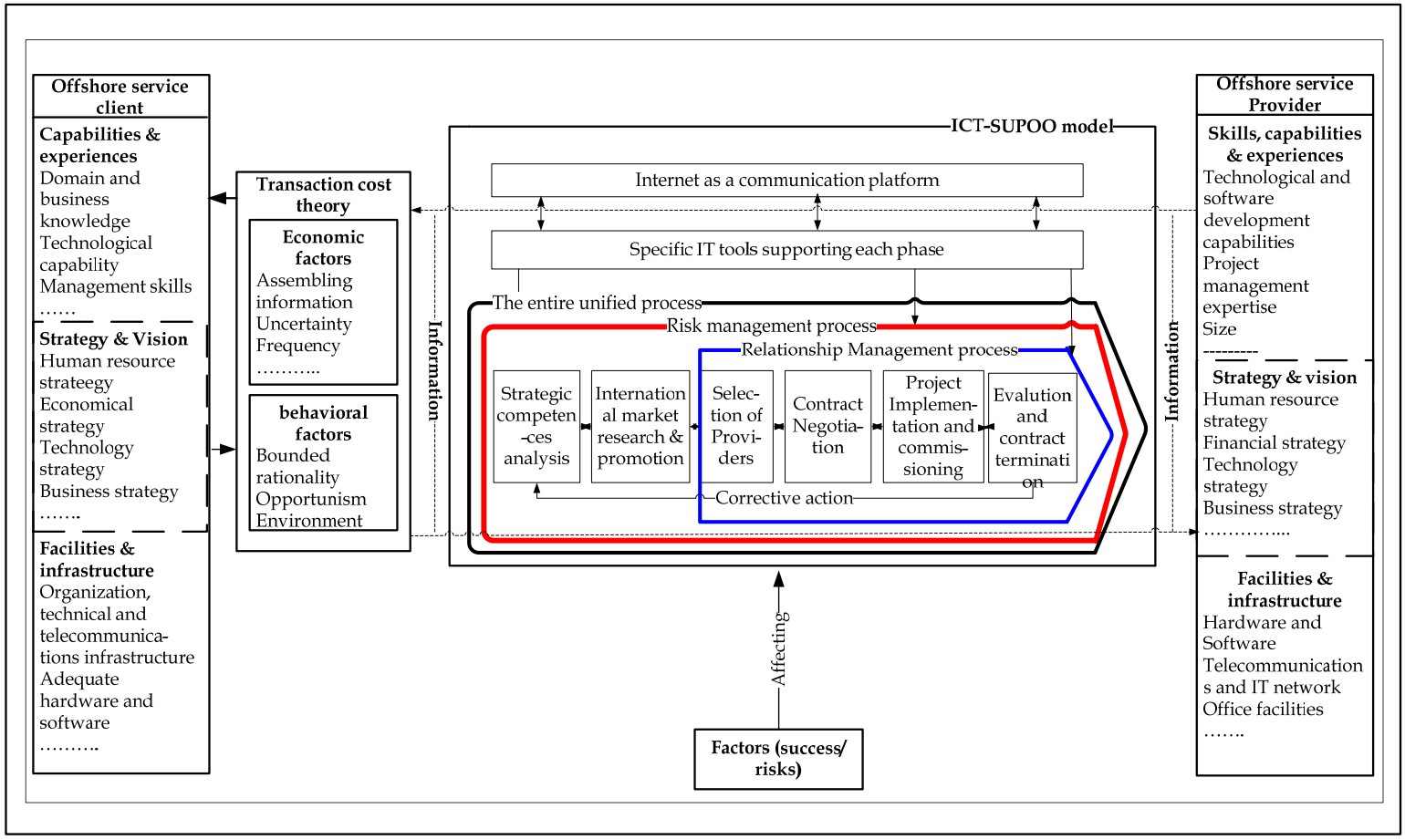


FIGURE 3 Research model

5 RESEARCH METHODOLOGY AND PHILOSOPHICAL APPROACH

This chapter deals with the philosophical perspective and the research method utilized in the empirical part of this study. The research design, research procedure, and case company selection process are presented. The codebook development and data collection and analysis processes used are explained. In order to increase the reliability and validity of the research, a multiple case analysis of four case companies is utilized.

As we explained earlier in Chapter 1, this research aims at developing a model that best describes the process of offshore outsourcing. This type of research can be categorized as theory building (Järvinen, 2001). Although offshore outsourcing is a new phenomenon, very limited research has been done on this particular topic. However, for a substantial advance of knowledge in any discipline, one must first have a firm foundation laid in the theory of knowledge, epistemology, and see how this is applied to that particular discipline.

5.1 The Philosophical Approach

In order to determine an appropriate research method for the study, it is necessary to distinguish between quantitative and qualitative research. Myers and Avison (2002) stated that there are two dominant groups of research methods in information systems—quantitative and qualitative. It has been shown that one of the differences between quantitative and qualitative research lies in the characteristics of the data (Creswell, 1994; Kaplan and Duchon, 1988). Quantitative methods emphazise the measurement and analysis of causal relationships between variables, not processes. They were originally developed in the natural sciences for the study of natural phenomena; they have been applied in the social sciences through survey methods, laboratory experiments, formal methods and numerical methods.

In contrast,

> "[q]ualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self" (Denzin and Lincoln 2000, p. 3)

In this context, qualitative research involves an interpretive, naturalistic approach to the world. Qualitative methods were developed in the social sciences to enable researchers to study social and cultural phenomena. These methods are useful in understanding people and the social and cultural contexts within which they live. Qualitative methods include action research, case study research and ethnography. Each of these methods has different ontological, epistemological, axiological, rhetorical, and methodological characteristics (Creswell, 1998, 1994). According to Denzin and Lincoln (2000, p. 4), qualitative research involves

> "the study and collection of variety of empirical materials--case study, personal experience, introspection; life story; interview; artefacts; cultural texts and productions; observational; historical; interactional, and visual text--that describe routine and problematic moments and meanings in individuals' lives".

Qualitative-based research aims for a holistic analysis of the phenomenon. It is believed to be useful in describing and illuminating the context and conditions under which research is conducted (Cook and Campbell, 1979). To justify the use of qualitative approach for this type of study, Kaplan and Duchon (1988, pp. 572-573) explain that

> "Immersion in context is a hallmark of qualitative research methods and the interpretive perspective on the conduct of research. Interpretive researchers attempt to understand the way others construe, conceptualise, and understand events, concepts, and categories, in part because these are assumed to influence individuals' behaviour. The researchers examine the social reality and inter-subjective meanings held by subjects by eliciting and observing what is significant and important to the subjects in situations where the behaviour occurs ordinarily. Consequently, qualitative methods are characterised by (1) the detailed observation of, and involvement of the researcher in the natural setting in which the study occurs, and (2) the attempt to avoid prior commitment to theoretical constructs or to hypotheses formulated before gathering any data."

According to Orlikowski and Baroudi (Orlikowski and Baroudi, 1991), Myers (1997) and Myers and Avison (2002), qualitative research can be positivist, critical, or interpretive. Positivist studies are characterized by the existence of a priory fixed relationship between phenomena investigated with structured instruments. Positivist studies generally attempt to test theory in an attempt to increase our predictive understanding of phenomena (Myers, 1997; Orlikowski and Baroudi, 1991). Orlikowski and Baroudi classify IS research as positivist if there is evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and inferences drawn about a phenomenon from the sample with reference to a stated population.

Critical researchers assume that social reality is historically constituted, that it is produced and reproduced by people, and that the ability of people to act to change their social and economic circumstances is constrained by various forms of social, cultural, and political domination. Critical research focuses on the oppositions, conflicts, and contradictions in contemporary society and seeks to serve as an emancipator; it aims to help eliminate the cause of alienation and domination (Orlikowski and Baroudi, 1991; Myers and Avison, 2002). According to Orlikowski and Baroudi (1991), IS research can be categorized as critical if there is evidence of a critical position toward taken-for–granted assumptions about organizations and information systems, as well as a dialectical analysis that attempts to reveal the historical, ideological and contradictory nature of existing social practice.

Interpretive research begins with the assumption that reality is socially constructed by human actors. In this regard, objective data cannot be obtained, since the enquirers use their own mental model in guiding the process of enquiry. In conducting an interpretive study, one seeks to find out and understand a phenomenon or a process, the perspective and the mental construct of the people involved, or a combination of these. In addition, Walsham (1995a, 1995b) stated that the researcher's interaction with the human subject of the enquiry has an impact on both parties' perception.

The philosophical base of interpretive research is hermeneutics and phenomenology (Boland, 1986). Interpretive study refutes the possibility of an 'objective' or 'factual' account of events and situations, seeking instead a relativistic, albeit shared, understanding of phenomena (Orlikowski and Baroudi, 1991, p. 5). According to these writers, IS research is interpretive if a non-deterministic perspective is substantiated. For example, the intent of the research is to increase our understanding of the phenomenon within its cultural setting and from the perspective of the participants, where researchers do impose their outsiders' a priori understanding on the situation. Based on this classification, the philosophical underpinning of the present study is interpretive, because our aim is to understand the combination of processes and the mental construct of the people involved in offshore outsourcing, as well as how they use ICT to support the activities of this process. Having briefly discussed the philosophical stance of this study, next we will describe the research method used therein.

5.2 Research Design and Method

According to Yin (1994, p. 13), "a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". Little is known about the ICT-SUPOO of software production, since this area of research is new. This research requires current data as well as past

data. The case study method, therefore, appears to be the most suitable for this study. The main goal of the field study is to explore how a) the ICT-SUPOO is executed and b) the offshore outsourcing project is managed from both the service provider's and client's perspectives. Yin (1994) states that certain topics, such as organizations, processes, programs, institutions, and events are suitably examined through the case study method. The focus of the investigation in this study is a "process" analysis. This study uses a case study approach because it enables us to study the ICT-SUPOO in natural settings.

Miles and Huberman (1994, p. 172) state that in multiple-case research, "there is much potential for both greater explanatory power and greater generalization than what a single-case study can deliver". A multiple-case study method is also less subject to bias than is a single-case study (Miles and Huberman, 1994; Yin, 1994).

The multiple-case study design permits the researcher to explore the phenomenon under investigation through the use of a replication strategy. Yin (1994) compares the use of the replication strategy to the process of conducting a number of separate experiments on related topics. Replication is carried out in two stages—a literal replication stage, in which cases are selected to obtain similar results, and a theoretical replication stage, in which cases are selected to explore and confirm or disprove the patterns identified in the initial cases. According to this model, if all or most of the cases provide similar results, there can be substantial support for the development of a preliminary theory that describes the phenomenon (Eisenhardt, 1989a). Thus, a multiple case study design enhances generalizability and reduces bias.

Miles and Huberman (1994, p. 173) state that in multiple-case research, "there is much potential for both greater explanatory power and greater generalization than what a single-case study can deliver". A multiple-case study method is also less subject to bias than the single-case study (Miles and Huberman, 1994; Yin, 1994). Since a multiple-case study design enhances the generalizability and reduces bias, this study uses a multiple-case design. Another motivation for a multiple-case study method is that a researcher has an opportunity to observe and analyze a phenomenon that might have been previously inaccessible to scientific investigation.

According to Miles and Huberman (1994), a cross-case analysis attempts to understand the processes and outcomes that occur across many cases and to then enable the development of more sophisticated descriptions and more powerful explanations. This study investigates the IT-supported offshore outsourcing of the software production process by using multiple cases through cross-case analysis. It examines the same phenomenon in different settings, systematically compares and contrasts the phenomenon across the cases, and thus establishes generalizations about the findings. The researcher may identify the conditions under which these findings are able to occur.

A total of ten companies were identified, from which four case companies were selected. Following Yin's (1994) suggestion, special attention was given to the selection of appropriate case companies. He maintains that the case

companies selected must have already successfully executed the same process that is under investigation. The types of case companies that were selected for this study fit this profile, as they have already successfully executed several offshore outsourcing projects, and they heavily use ICTs in their international business operations. These companies were knowledgeable and willing to share their knowledge, opinions, and insights.

The field study was conducted at four companies during recent years. Interviewing the right people was of significant importance to the quality and credibility of our research. We used a rich and flexible data-gathering strategy that required finding a representative, unbiased set of data. In gathering data, we approached key informants from all the layers of the office who had a stake in the implementation of the ICT-supported, unified process of offshore outsourcing. We conducted interviews with the following people: 1) a chief executive officer or top management individual, 2) a business manager or officer working at the remote location, 3) an outsourcing project manager, 4) an outsourcing project coordinator, 5) individuals involved in negotiating offshore contract deals, 6) persons involved in executing the offshore outsourcing process, 7) an IT manager, and 8) a system analyst. Each of these personnel had five to 10 years of work experience in the outsourcing field. They had Masters and Ph.D. degrees in Software Engineering, Computer Science, Information Systems, Economics, Business Administration, etc. This provided an adequate number of people with various sorts of experience covering all aspects of ICT-supported offshore outsourcing of software production.

The main research questions, the conceptual model presented in this study, the background theory, and the questionnaire guide that was developed all acted as a basis for the field study. The questionnaire guide was composed of open-ended and semi-structured questions (see Appendix 1). The information we sought was mostly unstructured and non-quantitative. Therefore, the primary data collection method we followed was semi-structured interviews. In addition, we asked the normal background information about the size and type of business, as well as about the affiliation and education level of the interviewees.

In total, five to eight people from each company were interviewed (the locations included St. Petersburg, Russia; Helsinki, Finland, Jyväskylä-Finland; Bangalore, Delhi, and Calcutta, India). Each interview lasted more than three hours. Each person was interviewed three to five times. Each interview was fully transcribed. All the interview records were downloaded and the transcriptions saved in an MS Access research database. In addition, documents such as research reports, market research reports, annual reports, internal company magazines, releases, and other archival materials from both the provider and client companies were collected and analyzed. We also conducted over 35 interviews with researchers and practitioners in the field of offshore outsourcing.

We maintained a consistent practice of sharing the data as they were collected and holding regular meetings and communication through email and

chat in order to enable a continuing critical assessment of our progress and to permit follow-ups where needed. We also assessed the quality of these interviews when analyzing the empirical findings.

5.3 Codebook Development

Our codebook creation followed the steps proposed by MacQueen et al. (1999) to ensure inter-coder reliability. We developed codes (referred to as themes mentioned below) in a tree-like structure. Codes were selected to mark the existence of an item.

5.4 Data Analysis

Data analysis was done using the qualitative data analysis (QDA) software NVivo7. The software program NVivo7 is a computerized tool that can assist a qualitative researcher in effectively managing large numbers of qualitative data (Richards, 2005; Richards, 1999). The QDA software facilitates the analysis process (Richards, 2002). In this study, we used this software for coding (see Appendix 2), linking codes and text segments, documenting variability in codes, creating memos, searching, editing and reorganizing, visualizing representations of the data, seeing patterns (e.g., in matrices, modeling networks or associations), and organizing findings (Miles and Huberman, 1994; Richards, 2005).

Miles and Huberman (1994, p. 56) assert that "[c]oding is analysis". The systematic coding of text for data analysis is one of the essential parts of qualitative research (Miles and Huberman, 1994; Richards, 2005; Strauss and Corbin, 1990). Codes enable one to organize the text of the transcripts and discover patterns within that organizational structure. Auerbach (2003) and MacQueen et al. (1999) describe codes as building blocks for theory or model building, and as the foundation on which the analyst's arguments rest. Our analysis process was divided into several steps.

The research framework and an interview guide were used to maintain the focus on data collection, and to reduce the amount of material to be processed. In order to make data analysis both rigorous and effective, this study systematically deployed several strategies suggested by Nahar (2001) and Richards (2005). The first step was informal data analysis that was performed during, and immediately after, each interview: a) during each interview, ideas and references to the theory were written down as they occurred; b) summaries of interviews were performed immediately afterwards; and c) preliminary findings were identified from each summary.

The interview summary and identification of each preliminary finding were useful for data reduction and conducting preliminary analysis. The second step was transcribing the tape-recorded interviews. This step was a more formal process compared with the first step. During this step, tape-recorded interviews were thoroughly listened to and transcribed verbatim following a second listening. A third listen, where the transcribed texts were compared to the tapes, was also conducted.

A narrative was developed from each interview, and the interviews were organized thematically. The themes include the phases of the ICT-supported offshore outsourcing process, the software production, the project management and the ICT used. The data were sorted according to the set themes, which allowed us to reduce the volume of data. The comparative presence of each theme in all the narratives has been analyzed extensively. Some similarities emerged in all interviews.

5.5 Validity and Reliability

To improve the reliability and validity of this research, a number of measures were applied. First, the background theory, the research model and a questionnaire guide were used in order to provide detailed documentation of the data and minimize errors and biases. The questionnaire guide was reviewed by our case companies, researchers, and practitioners. Second, interviewees selected were involved in the outsourcing process and possessed an in-depth knowledge of the phenomenon under investigation. Third, the concepts of this research were delineated to interviewees before we conducted the interviews. The same questions were asked of all interviewees, and the results were compared. The data were read several times to ensure familiarization. Fourth, multiple data sources were utilized in order to increase the reliability and validity of the research. Fifth, research results were compared with prior research in the international outsourcing field. Further comparison was made with available published materials from the case companies. These measures increase the external validity of the research and overcome the specific criticism that case studies are not easily open to generalization. Sixth, each case report was carefully edited and forwarded to interviewees to check for possible errors and omissions and to evaluate the validity of our interpretation of their "story" (Stake, 1995; Yin, 1994). All the errors and omissions were corrected, and some statements were modified to reflect the true opinions and perceptions of the interviewees. Data and interpretations were checked by the interviewees through a formal presentation, through case report checking, and through our senior collaborators and researchers in the outsourcing field. In addition, the original raw data were presented for the readers to see, improving the internal validity of the study (Patton, 1990). Finally, the research path for the case study method was consistently documented to ensure reproducibility (Yin, 1994). To

support the analysis, a number of quotations from the interviewees were included in the case analysis section.

6 SUMMARY OF THE ORIGINAL ARTICLES

In this chapter, we present a brief discussion of each of the articles included in this dissertation. For each article, the research objective and the findings are described below.

6.1 Article I. "A Conceptual Model of ICT-Supported Unified Process of Offshore Outsourcing of Software Production"

Yalaho, A. A Conceptual Model of ICT-Supported Unified Process of Offshore Outsourcing of Software Production. Journal of Information Technology for Development (Resubmitted).

Research objectives

The main objective of this research is to develop an ICT-SUPOO model for software production. The ICT-SUPOO model attempts to provide a detailed guideline to manage the entire process of offshore outsourcing by integrating a number of key issues such as relationship management and risks management. To do this, this model investigates a large body of extant literature, an endeavour that yields the understanding that several frameworks for guiding information systems (IS) managers through IT outsourcing have been developed. However, none of these frameworks have attempted to provide detailed guidelines for managing the entire process of the offshore outsourcing of software production. There is a significant lack of studies dealing with this topic. Therefore, there is a great need for studies that explore such a multifaceted and complex phenomenon more deeply in order to find out the best practices for managing the process. The basic research question addressed in this study is: how can software production through ICT-SUPOO be executed and managed effectively? In addition to the primary research question, the model addresses four sub-questions which have not been covered extensively in the existing literature. (1) What are the phases in the ICT-SUPOO model for

software production, and how are these phases executed? (2) Which major activities, performance measures, and expected outcomes in each phase of the process are executed and managed effectively? (3) How are risk-management activities executed? (4) Which ICT tools best support the phases in general and each phase in particular?

Research findings

This research develops an integrative perspective on several issues that fall under the ICT-SUPOO software production umbrella. It contributes to the understanding of this phenomenon by extensively analyzing the major processes and their activities, performance measures, and deliverables. In addition, it demonstrates that the systematic utilization of ICT can facilitate cost-efficient offshore outsourcing.

The model developed in this study is unique because it brings to light all the concurrent processes that take place during the actual process of the offshore outsourcing of software production. It is significantly different from earlier works (Greaver II, 1999; Momme 2001; McIvor 2000, Yalaho and Wu 2002; Yalaho et al. 2005) in that it provides a systematic and unified view of all the phases in the main processes and sub-processes.

This research contributes to the existing body of knowledge regarding how best to manage the offshore outsourcing of software production projects through the ICT-SUPOO model. Such a holistic but detailed view is important for advancing future outsourcing research and helping companies execute ICT-SUPOO successfully. It also contributes to ICT-SUPOO project management by identifying and analyzing the main phases (see section 3.3.1 of article I) of the process. Such analysis can further inform the development of the more effective management of activities. It provides a better understanding of how one could manage an offshore outsourcing software provision project.

6.2 Article II. "The ICT-Supported Unified Process Model of Offshore Outsourcing of Software Production: Cross-case Examination and Validation"

Yalaho, A. and Nahar, N. The ICT-Supported Unified Process Model of Offshore Outsourcing of Software Production: Cross-case Examination and Validation. The DATA BASE for Advances in Information Systems (Submitted).

Research objectives

The aim of this article is to validate the ICT-SUPOO model through a cross-case analysis. The basic research questions addressed in this study are therefore: 1) What are the phases in the ICT-supported unified process of offshore

outsourcing of software production that service providers and clients utilize? and 2) Which major activities, performance measures, and expected outcomes in each phase of the process are executed and managed effectively? This study seeks to answer these questions by analyzing the past literature on offshore outsourcing, the offshore outsourcing of software production, ICT, and transaction cost theory, as well as by utilizing the research model developed by Yalaho (2006). The research model is then empirically validated through multiple case studies, in which professionals with extensive experience in managing the offshore outsourcing of software production are interviewed.

Research findings

The implications of this study are twofold: First, practitioners can benefit from the detailed activities of what actually happens in the ICT-SUPOO model. Moreover, the study can facilitate a better understanding, and dissolve the complexity of offshore software development to a greater extent. Offshore outsourcing is an increasingly popular business strategy, but it is difficult to execute successfully due to the intricate activities involved and the lack of a detailed process model. Therefore, the ICT-SUPOO model will be of great use for practitioners.

This study finds that relationship management and risk management are not phases within the process, as has been suggested in earlier studies (see, e.g., Momme (2001), Yalaho and Wu (2002), and Momme and Hvolby (2002)). Instead, relationship management and risk management are evolving activities which cannot be taken as single phases or represented as such; rather, they span the other phases. This is a finding that is unique to our research. No prior study shows this.

Second, the study contributes to the growing body of knowledge on offshore outsourcing from the management perspective. The main findings of the study support other studies (Apte et al., 1997; Rottman and Lacity, 2006; Scheibe et al., 2006) wherein the imperatives for offshore outsourcing are presented. For example, it was noted that offshore outsourcing tends to be problem-free when good relations are maintained, effective communication is kept up, all parties trust each other, and minor differences in linguistic abilities are not overblown. Additionally, systems development projects that are culture-neutral thrive and proceed smoothly despite cross-national or cultural differences.

This study includes several new findings. First, service providers have carried out a distinctive set of activities (or used an idiosyncratic approach) to reach their potential customers (see Phase 2 in article II, service provider perspective). Second, offshore service providers also strategically have targeted specific countries in which they would like to sell their services (see as above , service provider perspective). Third, both clients have had previous experience and have worked for several years in the country of their respective selected provider. Therefore, they knew very well the selected country's business practices in general, as well as most outsourcing players in particular (see as

above, client perspective). Fourth, service providers were selective regarding which contract they wished to enter into. This indicates that service providers are very experienced and have a high degree of knowledge, enabling them to make the right choice while engaging in a contract (see as above, service provider perspective). Fifth, contracts were based on "social relation". FinSoftAlfa and its partner IndiaSoftNet in particular considered the contract as a tool that provides minimum safeguards, but for a long-term healthy and sustainable business relationship, one needs to build trust, which derives not from a contract but rather from social relations (see as above, client perspective).

Clients and service providers often complain of opportunism, rising transaction costs of all sorts, and an inability to influence the terms of their relationships. However, many of these problems are preventable, as they may be caused by poor management decision-making. Moreover, offshore outsourcing involves multiple processes which must be handled simultaneously in order to reduce transaction costs and the risk of failure. Through our empirical data, we reveal how transaction costs are minimized through: (1) strategic competences analysis, (2) international market research and promotion, (3) the selection of service providers, (4) contract negotiation, (5) project implementation and commissioning, and (6) evaluation and contract termination. The use of an ICT-SUPOO model can narrow, if not, reduce the unexpected transaction costs and control problems at successive stages of the offshore outsourcing relationship. In addition, we have demonstrated how contractual trust and strong social relationships create another type of governance, as opposed to the governance described by Williamson (1979).

This study demonstrates that the ICT-SUPOO model is a rational model for the execution of offshore outsourcing. The model can be used in all offshore outsourcing situations with some adjustments. The number of phases may vary in some cases. The applicability of the model may have to be enhanced, especially with respect to using ICT tools in order to support the offshore outsourcing process. For example, small and agile companies may cope well with a simple and lightweight set of tools. The ICT infrastructure, the dependence on standards, and the lack of common infrastructure are the main reasons why the clients fail to use ICT for offshore outsourcing. On the whole, this study extends our knowledge through empirical evidence about the practice of offshore outsourcing presented by our four case studies from several major countries in the global software industry.

6.3 Article III. "Plugging into Offshore Outsourcing of Software Development: A Multiple Case Study"

Yalaho, A. (2007). Plugging into Offshore Outsourcing of Software Development: A Multiple Case Study. Issues in Information Systems Journal, VIII (2),499-515.

Research objectives

The objective of this study is to explore the offshore relationship between client and service provider through multiple case studies. It presents its findings in tune with prior IS literature on offshore outsourcing of systems development.

Research findings

The key finding of this work is that a company serving as a broker house was able to act as a buffer for local clients in the process. The accumulated expertise it gains is put to further use in sourcing potential partners from foreign lands for local companies with little or no experience in sourcing and dealing with foreign partners themselves. The company, in effect, was able to reduce the shortcomings that lack of experience or ignorance would have caused a local firm attempting the practice for the first time. The company also ensures that a good working relationship is maintained. The role of social relationships in the offshore outsourcing is valued more on the Finnish side than the contract. On the other hand, the Indian software house is looking for partners that are able to pay them handsomely, treasure their expertise and continue to use them in the future. To this end, the Indian software house upgrades its skills or knowledge base; and at the same time, they do not downplay the need to value good and efficient communications and trust, which they believe will generate customer satisfaction.

Additionally, the Indian software house brought to the arrangement with the Finnish partners technical expertise, which the clients apparently appreciated. The reasons for this house's involvement in offshore outsourcing arise from the fact that it has the required skills and expertise in demand in Finland. Moreover, the Indian software house was able to secure the contract in Finland through its earlier contacts with the Finnish software broker house. The management of the Indian firm treasures customer satisfaction and cost savings for its client as well as high quality and innovative products. However, the organization's main problems emanate from the differences between the two countries. Specifically, the Finnish side notes misunderstandings in communication. Notwithstanding, this problem has not affected the system development project in any way, as the software broker house is familiar with the Indian mode of expression after having made several visits to India. Furthermore, since the type of project that they are engaged in is 'culture-neutral', no major problems were seen. Visa procurement for the Indian workers was another glitch that the broker house was able to attend to. Efficient

communication, enabled by technology, was important in that it facilitated smooth relations between the Indian software house and the Finnish client.

6.4 Article IV. "Risk Management in Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study"

Yalaho, A. and Nahar, N. 2008. Risk Management in Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study. ***Journal of Information Technology*** **(Submitted).**

Research objectives

The main focus of this study is to identify a list of risks that affect the success of ICT-SUPOO of software production projects, analyze how these risks are created, and consider which strategies our case companies adopted to alleviate the risks. Thus the main research questions are the following: what are the key risks of ICT-SUPOO for software production how are risks created at each phase of the process, and which strategies should be taken into account to reduce such risks? We carry out a multiple case study from both the service provider's and client's sites, where professionals with extensive experience in managing offshore outsourcing of software development were interviewed on these research questions.

Research findings

Research findings indicate that our case companies faced various important risks in implementing the ICT-SUPOO model of software production. The research findings may guide companies to employ appropriate risk management strategies beforehand in order to avoid these risks. This research reveals the key risk factors that may hinder the execution of ICT-SUPOO if they are not investigated carefully in advance and appropriate strategies are not taken to reduce their negative impacts. Some of our research findings support some risk factors suggested by previous offshore outsourcing literature, whereas some of our risk factors are new findings.

The factors that are in line with outsourcing/offshoring literature are: a) a lack of preparation before going offshore (Lacity and Willcocks, 2001; Cannel 2005; King, 2005; King, 2006; Meyer, 2006), b) scarce investment for complex/critical software development projects (Smith et al., 1996; Overby, 2003; Tafti, 2005), c) a lack of financial resources (Smith et al. 1996; Qu and Brocklehurst, 2003), d) overstated expectation (McClelland, 1995; McClelland 2003; Londe, 2004; Dubie, 2008), e) the smallness of a company (Apte et al., 1997; Ang and Teo, 1997a; Rajkumar and Mani 2001), f) risks associated with

legal issues (Davis et al., 2006), g) political instability (Nicholson and Sahay, 2001; Preston 2004; Robbins 2004; Davis et al., 2006; Pai and Basu, 2007), h) high management skills requirements (Gottfredson et al., 2005; Olsen, 2006), i) a lack of domain-specific knowledge (Layzell, 2000; Kumar and Palvia, 2002; Nicholson and Sahay, 2004), j) a lack of intense and open communication (Yalaho et al., 2003; Rao, 2004), and k) a lack of control of the offshore service provider (Kliem 2004).

In this study, the new risk factors identified that may hinder the successful execution of ICT-supported offshore outsourcing include the following: a) deficiency in offshore business understanding on the client side, b) lack of rigorous risks analysis, c) currency instability, d) opportunistic service providers, e) the risk of losing an earned good reputation, f) differences in the interpretation of project specifications, g) punishment schemes for delaying projects, h) selection of governing law in the case of conflicts, i) differences in project management practices, j) insufficient project management skills on the client side, k) insufficient technical knowledge of the client, l) delay in payments, m) excessive need for control on the client side, and n) unclear strategy for the use of ICT support for communication, coordination, and collaboration.

The risks associated with the ICT-SUPOO model for software production may not totally be avoided, as some factors (e.g., political instability) are outside the control of service provider and clients, but companies need to be prepared for them and have effective risk management strategies in place so as to enhance the success of the outsourcing project.

The research findings for this study indicate that several different strategies are needed to manage the risks of ICT-SUPOO for software production. This study's comprehensive risk management strategies have been described in article IV and make the research results unique.

This study is relevant to both current and future ICT-supported offshore outsourcing, as offshore outsourcing is becoming increasingly important for companies. We believe that by focusing on these important key risks, a company can reduce them to some extent and increase the possibility of success in their offshore outsourcing endeavors.

6.5 Article V. "Key Success Factors for Managing Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-Case Study"

Yalaho, A., Nahar, N. and Heikkila, J. 2008. Key Success Factors for Managing Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study. European Journal of Information Systems (*under revision according to editor comments*).

Research objectives

The objective of this study is to investigate the critical success factors of ICT-SUPOO. A multiple-case study is carried out from both the client and service provider's sites, where professionals with extensive experience in managing the offshore outsourcing of software development are interviewed. Through in-depth empirical research, we identify a list of critical factors that affect the success of such projects. In addition, we also investigate how these factors enhance success. Thus, the main research question is the following: What are the critical success factors in the context of the ICT-SUPOO model of software production, and how do these factors enhance success in the offshore outsourcing process for software production?

Research findings

Our multiple-case study of the offshore outsourcing of software development, using Finnish, Russian, Indian, and Nepalese companies, revealed the critical success factors for ICT-SUPOO. No prior scholarly inquiry has investigated the critical success factors of ICT-SUPOO in depth or has examined the service providers and users simultaneously. In this study, the identification and analysis of the critical success factors make the research results novel.

This research reveals that the ICT-SUPOO was successful due to some specific factors. Some of these research findings support various factors that are suggested by the offshore outsourcing literature, while some other factors are new findings. The factors identified that agree with the related literature are: a) a high availability of skilled IT professionals (Kliem 2004; Yalaho and Nahar 2007), b) sufficient technical knowledge (Jensen, et al. 2007), c) adequate financial resources (Chalos 1995; Ellram 1995), d) a good understanding of user cultural dimensions about UI design and product knowledge (Shore and Venkatachalam, 1994; Gupta and Raval, 1999; Nicholson and Sahay, 2001), e) relationship management (McFarlan and Nolan, 1995; Rajkumar and Mani, 2001; Granovetter, 1985), f) effective time management (Overby, 2003), g) the division of the project into manageable parts (Rottman, 2006; Kornstädt and Saue 2007), h) sufficient domain-specific knowledge (Nicholson and Sahay

2004; Scheibe et al., 2006), and i) an analysis of providers' early success/failure cases before selection (Gupta and Raval, 1999; Darja, 2006).

The new factors identified for the success of ICT-supported offshore outsourcing include: a) agreed-upon specifications of IS, b) effective global coordination and control, c) personal references/contacts, d) the company being of a suitable size, e) appropriate ICT tools and their effective usage, and f) joint processes.

This study is relevant to both current and future ICT-SUPOO, as it is becoming increasingly important for companies. Our research findings provide a detailed picture of which resources are required in ICT-supported offshore outsourcing. By using the research results, companies will be able to facilitate ICT-supported offshore outsourcing successfully.

7 CONCLUSIONS, LIMITATIONS AND FURTHER STUDY

This chapter provides a summary of the study and explains the findings. Section 7.1 offers the theoretical implications of the research. Section 6.2 discusses the major findings in the context of transaction cost theory, and Section 6.3 discusses the practical implications of the research. Limitations of the research are noted in Section 6.4. In Section 6.5, directions for future research are suggested.

7.1 Major Contributions of the Study

This study was carried out with the expectation that it would produce several contributions to the field. The rationale for the study is the following: a) The very limited amount of research conducted on ICT-SUPOO of software production; b) The fact that limited research on offshore outsourcing projects exists focusing on some specific activities in the process; c) Several existing frameworks noted that guide managers through IT outsourcing deal with very specific areas of IT outsourcing or offshore outsourcing such as outsourcing decision, competence analysis, decision factors of IT outsourcing, risk management, relationship management and so forth; d) The lack of empirical research on the risk factors of ICT-SUPOO for software production and how these factors hinder software production through offshore outsourcing; and e) the lack of empirical research on measures that are necessary to reduce risks in order to enhance the success of the ICT-SUPOO model of software production.

Through a multi-site cross-case study, the ICT-SUPOO for software production has been examined. The analysis has revealed that the ICT-SUPOO goes through the following phases: a) strategic competences analysis, b) international market research and promotion, c) selection of provider(s), d) contract negotiation, e) project implementation and commissioning, and f) evaluation and contract termination; these phases constitute the main process of

offshore outsourcing. However, the above main phases are executed concomitantly with risk management processes. Then the relationship management process starts with contract negotiation and continues until the project is completed. This study clearly shows that relationship management and risk management are not phases within the process, as is suggested in earlier studies (see, e.g., Momme, 2001; Yalaho and Wu, 2002; Momme and Hvolby, 2002; McIvor, 2000). Instead, relationship management and risk management are evolving activities which cannot be taken as a single phase or represented as such; rather, they span the other phases of the ICT-SUPOO model. This is a unique finding from our research. No prior study notes this.

Through a cross-case analysis, we have examined and analyzed the key risk factors that may hinder the execution of ICT-SUPOO if they are not investigated carefully in advance and appropriate strategies are not taken to reduce their negative impacts. Research findings indicate that our case companies faced various significant risks in using the ICT-SUPOO model of software production. A few of these risks appeared to be more commonly encountered in ICT-SUPOO and are aligned with offshore outsourcing literature (see Article IV). In contrast, the new risk factors that were identified in this study and that may hinder the successful execution of ICT-SUPOO include the following: a) deficiency in offshore business understanding on the client side, b) lack of rigorous risks analysis, c) currency instability, d) opportunistic service provider, e) risk of losing earned good reputation, f) difference in interpretation of project specifications, g) punishment scheme for delaying the project, h) selection of governing law in the case of conflicts, i) difference in project management practices, j) insufficient project management skills on client side, k) insufficient technical knowledge of client, l) delay in payments, m) excessive need of control on client side, and n) unclear strategy for the use of ICT support for communication, coordination and collaboration.

In addition, this research provides the strategies that are necessary to alleviate the risks encountered and enhance the success of the ICT-SUPOO for software production.

Through a cross-case analysis, factors have been identified and analyzed that contribute to the successful implementation of an ICT-SUPOO for a software production project. In this study, many of the common success factors of the ICT-SUPOO model of software production are aligned with the offshore outsourcing literature (see Article V). However, the new success factors identified in this study include the following: a) agreed-upon specifications of IS, b) effective global coordination and control, c) personal references/contacts, d) the company being of a suitable size, e) appropriate ICT tools and their effective usage, and f) joint processes.

No prior scholarly inquiry has examined in depth an ICT-SUPOO of software production. This study's broad overview of the development of a new and advanced ICT-SUPOO model of software production, identification of the success factors as well as the factors that may obstruct success and cause failure, and analysis of actions necessary to enhance the model's success make the

research results unique. It should also be noted that the offshore outsourcing model presented here deals with many different type of ICTs and is not limited to the few and more commonly known ICTs such as email, chat, newsgroup, web and database. Hence, in its depth and scope, this study provides a greater richness of understanding in this area and contributes to the existing body of knowledge in the field of outsourcing and offshore outsourcing.

7.2 Major Findings in the Context of the Background Theory

Here are the new findings associated with ICT-SUPOO in the context of the transaction cost theory. a) There is a distinctive set of activities (or an idiosyncratic approach) that service providers carried out to reach their potential customers, along with reducing search and marketing cost (see, Phase 2 in article II, service provider perspective). b) Offshore service providers also strategically target specific countries in which they would like to sell their services in order to keep the cost advantage (that is, to be cheaper than the client's country competitors) (see as above, service provider perspective). c) Both clients have previous experience and have worked for several years in the country of their respective selected provider. Therefore, they knew very well the selected-country's business practices in general, as well as most outsourcing players in particular (see as above, client perspective). d) Service providers are selective regarding which contracts they wish to enter into. This indicates that service providers are very experienced and have a high degree of knowledge, which enables them to make the right choice when engaging in a contract (see as above, service provider perspective). e) Contracts are based on "social relations". FinSoftAlfa and its partner IndiaSoftNet in particular considered the contract as a tool that provides minimum safeguards, but for long-term healthy and sustainable business relationships, one needs to build a kind of trust that does not derive from a contract but resides in social relations instead (see, as above, client perspective).

Often clients and service providers complain of opportunism, rising transaction costs of all sort, and inability to influence the terms of the relationship. However, many of these problems experienced by firms are preventable, as they may cause by poor management decision making. Moreover, offshore outsourcing involves multiple processes which must be handled simultaneously in order to reduce transaction costs and the risks of failure. Through our empirical data, we reveal how transaction costs are minimized at: (1) strategic competences analysis, (2) international market research and promotion, (3) selection of service providers, (4) contract negotiation, (5) project implementation and commissioning, and (6) evaluation and contract termination. The use of an ICT-SUPOO model as a tool to narrow, if not, reduces the unexpected transaction costs and control problems. In addition, we have demonstrated how contractual trust and strong social

relationship create another type of governance as opposed to the governance described by Williamson (1979).

7.3 Implications for Practice

This study offers an approach to effectively executing an ICT-supported unified process of offshore outsourcing. This study is relevant to current, as well as future, ICTand to the technology-driven global business environment. Globally distributed software development is a very challenging business. In order to overcome some of these difficulties, companies are trying to utilize ICT to mitigate the risks that they face in their offshore outsourcing of the software development effort. ICT-based training tools, which leverage multimedia, could be very useful (for example) in training employees.

This study presents ICT-SUPOO project management by identifying and analyzing the main phases of the process. Practitioners can benefit from the detailed activities of what actually happens in the ICT-SUPOO. The study also facilitates better understanding, and dissolves the complexity of offshore software development. Offshore outsourcing or global sourcing is an increasingly popular business strategy, but it is difficult to execute successfully due to the intricate activities involved and the lack of a detailed process model. Therefore, the ICT-SUPOO model will be of great use for practitioners.

In addition, this study identified and analyzed a number of new 1) risk factors (guiding companies to take appropriate risk management strategies beforehand in order to avoid these risks) and 2) success factors that provide a detailed picture of which resources are required in ICT-SUPOO.

7.4 Limitations of the Study

This study has some limitations.

There has been a significant lack of academic research on the ICT-SUPOO model of software production. Therefore, the review of the literature and background information had to be compiled from a variety of sources, such as IT, ICT, transaction cost theory, IT outsourcing, the offshore outsourcing of software production, and distributed software development. The research method and questionnaire guide had to be developed; it was tested and reviewed by supervisors and several senior researchers. These activities took a substantial amount of time and in turn had an effect on the amount of time spent on empirical research, which is thereby limited in terms of the number of cases.

The author encountered some obstacles at the beginning of the data collection that slowed down the process. Outsourcing and offshore outsourcing

are a very politically sensitive and strategic topic for many companies. Some chief executive officers (CEOs) are not willing to disclose their views and strategies with regard to this matter. In addition, this problem is exacerbated by the fact that the author is not a native of Finland; this made contact with case companies difficult. However, through the support and contact of the research supervisors, the author was able to get access to four case companies in total. The number of organizations represents clients and providers equally.

Despite the fact that we attempted to improve the generalizability of the results by drawing inferences from multiple case studies, it would be difficult to draw conclusions from only four case companies. In contrast, an in-depth analysis of each case study conforms with the interpretive research, which does not necessarily seek generalizations from the case setting to the population as a whole. Rather, as a substitute, interpretive research provides a profound understanding of the phenomenon, which can then inform other settings (Orlikowski and Baroudi, 1991). Furthermore, a multiple-case study was conducted to examine the ICT-SUPOO. According to Tellis (1997, p.6), "multiple cases strengthen the results by replicating the pattern-matching, thus increasing confidence in the robustness of the theory". We have investigated client companies that are Finnish software companies. Hence, the research results from the client perspective are based on the examination of companies within one country. Consequently, the research results may perhaps be a bit different in another context. For example, a French software company that has a different business culture and no previous knowledge or experience in offshore outsourcing might produce slightly different results. Due to the above limitations of this research, generalizations based on this study should be approached with caution.

7.5 Future Research Directions

The model developed in this study can be used as a basis for further research if more companies involved in offshore outsourcing are investigated. In the process of examining additional companies, we could further validate the model and learn from possible problems encountered. Toward this end, we are planning to interview some IT outsourcing companies in Germany, Romania, Czech Republic, France and Ukraine.

Another possible step for this research would be to investigate which categories of knowledge are transferred from offshore service clients to service providers and vice versa. How can knowledge be effectively transferred in an ICT-supported, unified process of offshore outsourcing of software production? It is also necessary to investigate whether the use of the ICT-SUPOO model enables the management of a culture-free offshore outsourcing relationship.

REFERENCE

Aalders, R. (2001). The IT Outsourcing Guide. Oxford, UK: Wiley.

Abdel-Malek, L., T. Kullpattaranirun, and S. Nanthavanij (2005). A framework for comparing outsourcing strategies in multi-layered supply chains. International Journal of Production Economics, 97(3), 318-328.

Adelakun, O. (2004). It outsourcing maturity model. In DeGross, J.; I. Benbasat, G. DeSanctis and C. Mathis Beath (Eds.) Proceedings of the Twelfth European Conference on Information Systems. Turku, Finland: Turku School of Economics and Business Administration.

Al-Obaidi, Z. (1999). International Technology Transfer Control: A Case Study of Joint Ventures in Developing Countries, in International Business. Helsinki School of Economics: Helsinki, Dissertation.

Alchian, A. A. and H. Demsetz (1972). Production , Information Costs, and Economic Organization. American Economic Review, American Economic Association, 62(5), 777-795.

Ancarani, A. and G. Capaldo. 2005. Supporting decision-making process in facilities management services procurement: A methodological approach. Journal of Purchasing and Supply Management. 11(5-6), 232-241.

Anderson, J. D. (1999). Internet outsourced application provides IT cost reduction. Health Management Technology 20(6), 32-33.

Ang, J. and T. S. Teo (1997a). CSFs and Sources of Assistance and Expertise in Strategic IS Planning: A Singapore Perspective. European Journal of Information Systems 6(1), 164-171.

Ang, S. and D. W. Straub (1998). Production and Transaction Economies and IS Outsourcing: A Study of the U.S. Banking Industry. MIS Quarterly 22(4): 535-552.

Apte, U. M., M. G. Sobol, and S. Hanaoka (1997). IS Outsourcing Practices in the USA, Japan and Finland: A Comparative Study. Journal of Information Technology 12(4), 289-304.

Aspray, W., F. Mayadas, and M. Y. Vardi. (2006). Globalization and Offshoring of Software: A Report of the ACM Job Migration Task Force, ACM. http://www.acm.org/globalizationreport/ 22.11.2006

Athreye, S. S. (2005). The Indian software industry and its evolving service capability. Ind Corp Change 14(3), 393-418.

Aubert, B. A., M. Patry, and S. Rivard. (2005). A framework for information technology outsourcing risk management. SIGMIS Database 36(4), 9-28.

Aubert, B. A., S. Rivard, and M. Patry. (1996). A transaction cost approach to outsourcing behavior: Some empirical evidence. Information & Management 30(2), 51-64.

Auerbach, C. F. (2003). Qualitative Data: An Introduction to Coding and Analysis. New York, NY, USA. New York University Press.

Bahli, B. and S. Rivard (2003). The information technology outsourcing risk: A transaction cost and agency theory-based perspective. Journal of Information Technology 18(3), 211-221.

Bagchi, P. K. and H. Virum (1998). Logistical alliances: trends and prospects in integrated europe. Journal of Business Logistics 19(1), 191-213.

Baldwin, Y. C. and B. K. Clark (2000). Design Rules Vol 1: The Power of Modularity. MIT Press.

Bakos, J. Y. and E. Brynjolfsson (1993). Information Technology, Incentives and the Optimal Number of Suppliers. Journal of Management Information Systems 10(2), 37-53.

Bartholomew, D. (1998). IT delivers for UPS. Industry Week 247 (23), 58-62.

Beath, C. (1983). Strategies for managing MIS projects: a transaction costs approach. Fourth International Conference on Information Systems (Eds, Ross, A. C. and Swanson, E. B.) Houston, Texas, 133-147.

Bhatnagar, S. C. and S. Madon (1997). The Indian Software Industry: moving towards maturity. Journal of Information Technology 12(4) 277 -288.

Boland, J. R. J. (1986). Phenomenology: a preferred approach to research on information systems. In B. Langefors, A. A. Verrijn-Stuart and G. Bracchi (Eds.) North-Holland Anthology of Papers From Conferences of The Ifip Technical Committee, Vol. 8: Trends in Information Systems. Amsterdam: North-Holland Publishing Co, 341-349.

Boulos, M., I. Maramba, and S. Wheeler. (2006).Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. BMC Medical Education, 6(1), 41.

Bowersox, D. J. and M. B. Cooper (1992). Strategic Marketing, Channel Management. New York: McGraw Hill Book Co.

Buchowicz, B. S. (1991). A Process Model of Make vs. Buy Decision Making: The Case of Manufacturing Software. IEEE Transactions on Engineering Management, 38(1), 24-32.

Campbell-Kelly, M. and D. D. Carcia-Swartz (2008). Economic Perspectives on the History of the Computer Time-Sharing Industry, 1965-1985. IEEE Annals of the History of Computing, 30(1), 16 - 36.

Cannel, E. N., Brian. (2005). Small firms and offshore software outsourcing: High transaction costs and their mitigation. Journal of global information management 13(3), 33-54.

Carmel, E. (2003a). Taxonomy of New Software Exporting Nations. Electronic Journal of Information Systems in Developing Countries 13(2), 1-6.

Carmel, E. (2003b). The New Software Exporting Nations: Success Factors. Electronic Journal on Information Systems in Developing Countries 13(4), 1-12.

Carmel, E. and R. Agarwal (2002). The maturation of offshore sourcing of information technology work. MIS Quarterly Executive 1(2), 65–77.

Chalos, P. (1995). Costing, Control, and Strategic Analysis in Outsourcing Decisions. Journal of Cost Management, 8(4), 31-37.

Chaudhury, A., K. Nam, and H. Raghav Rao (1995). Management of Information Systems Outsourcing: A Bidding Perspective. Journal of Management Information Systems 12(2), 131-159.

Chen, M. (1996). Managing International Technology Transfer. London., International Thomson Business press.

Chen, J., T. Liang, C. Tiejun and P. Xiaoyu (2005). The key factors of outsourcing in CoPs innovation. PICMET '05 Conference: Technology Management: A Unifying Discipline for Melting the Boundaries, Portland, Oregon, USA.

Cheon, M. J., V. Grover, and J. T. C. Teng (1995). Theoretical Perspective on The Outsourcing of Information Systems. Journal of Information Technology 10(4), 209-219.

Chutchian-Ferranti, J. (1999). Virtual corporation. Computerworld. 33(37), 64.

Coase, R. H. (1937). The Nature of the Firm. Economics 4(16) 386-405.

Coase, R.H., (1960) The Problem of Social Cost. Journal of Law and Economics. 3; 1-44

Cohen, L. (2003). Outsourcing Strategies and Challenges, Gartner Group publications: 23 -27.

Coleman, D. (1997) Groupware: Collaborative Strategies for Corporate LANs and Intranets, New York, Prentice Hall.

Conner, K. R. (1991). A Historical Comparison of Resource-Based Theory and Five School of Thought Within Industrial Organization Economics: Do We Have A New Theory of The Firm? Journal of Management 17(1), 121-154.

Cook, T. D. and D. T. Campbell (1979). Quasi-Experimentation, Design and Analysis Issues for Field Settings. Boston Houghton Mifflin.

Corbato, f. J., Merwin-daggett, M. and Baley, R. C. (1992) CTSS-the compatible time-sharing system. Annals of the History of Computing, IEEE, 14 (1), 31-32.

Correa, C. (1995). Strategies for software exports from developing countries. World Development 24(1) 171-82.

Creswell, J. W. (1994). Research Design: Qualitative and Quantitative Approaches. Sage publications, Thousand Oaks, CA

Creswell, J. W. (1998). Qualitative Inquiry and Research Design: Choosing Among Five. TraditionsThousand Oaks, CA. Sage Publications.

Cronk, J. and J. Sharp (1995). A Framework for Deciding What to Outsource in Information Technology. Journal of Information Technology 10(4) 259-268.

Croson, D. C. and M. G. Jacobides. (1997). Agency Relationships and Monitoring in Electronic Commerce. International Journal of Electronic Commerce 1(3) 65-82.

Darja, S. (2006). Global software development projects in one of the biggest companies in Latvia: is geographical distribution a problem? Software Process: Improvement and Practice 11(1), 61-76.

Davenport, H. T. and J. E. Short (1990). The New Industrial Engineering: InformationTechnology and Business Process Redesign. Sloan Management Review 31(4), 11–27.

Davis, G., P. Ein-Dor, William R. King, and Reza Torkzadeh. (2006). IT OFFSHORING: History, Prospects and Challenges. Journal of the Association of Information Systems 7(11), 770-795

De Boer, L., J. Gaytan, and Pilar Arroyo. (2006). A satisficing model of outsourcing. Supply Chain Management: An International Journal 11(5), 444-455.

De Groot, A. (1978). Thought and Choice in Chess,. Hague, Netherlands, Mouton De Gruyter.

Denzin, N. K. and Y. S. Lincoln. (2000). The discipline and practice of qualita tive research. In Denzin, N.K. and Y.S. Lincoln (Eds.) Handbook of qualitative research 2nd Ed. Sage Publication, Inc. 1-28

DeSanctis, G. and P. Monge (1998). Communication Processes for Virtual Organizations. Journal of Computer-Mediated Communication 3(4), 0-0.

Dess, G. G. and D. W. Beard (1984). Dimensions of organizational task environments. Administrative Science Quarterly 29(1), 52-63.

Dibbern, J., T. Goles, and Hirschheim, R. (2004). Information systems outsourcing: a survey and analysis of the literature. SIGMIS Database 35(4), 6-102.

Dubie, D. (2008). Offshore outsourcing not suited to small shops. 23/01/2008. http://www.networkworld.com/news/2008/012308-offshore-outsourcing.html. 17.2.2008.

Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty." Administrative Science Quarterly 17(3), 313-327.

E-CommerceTimes (2007). India IT Salaries Rise 15 Percent on Foreign Recruitments. 03/14/07 9:03 AM PT. http://www.ecommercetimes.com/story/56284.html. 23.4.2007.

EconomicTimes (2007). India's IT, software industry upbeat on future. THURSDAY, MARCH 29, 2007 11:45:08 AM]. http://economictimes.indiatimes.com/Indias_IT_software_industry_upbeat_on_future/RssArticleShow/articleshow/1826703.cms. 20/04/2007.

Edward J. Zajac, C. P. O. (1993). From Transaction Cost to Transactional Value Analysis: Implications for the Study of Interorganizational Strategies. Journal of Management Studies, 30(1), 131-145.

Ellram, L. M. (1995). Total cost of ownership: An analysis approach for purchasing. International Journal of Physical Distribution & Logistics Management 25(8), 4-23.

Erber, G. and A. Sayed-Ahmed (2005). Offshore Outsourcing: A Global Shift in the Present IT Industry. Intereconomics 40(2), 100-112.

Eisenhardt, K. M. (1989a). Agency Theory: An Assessment and Review. Academy of Management Review 14(1), 57-74.

Eisenhardt, K. M. (1989b). Building Theories From Case Study Research. Academy of Management Review 14(4), 532-550.

Elitzur, R. and A. Wensley (1997). Game theory as a tool for understanding information services outsourcing. Journal of Information Technology 12(1), 45 - 60.

Elmuti, D. and Y. Kathawala (2000). The Effects of Global Outsourcing Strategies on Participants' Attitudes and Organizational Effectiveness. International Journal of Manpower, 21(2) 112-128.

Fill, C. and E. Visser (2000). The Outsourcing Dilemma: a Composite Approach to the Make or Buy Decision. Management Decision 38(1), 43-50.

Franceschini, F., M. Galetto, A Pignatelli and M Varetto (2003). Outsourcing: guidelines for a structured approach. Benchmarking. An International Journal 10(3), 246-260.

Gavious, A. and G. Rabinowitz (2003). Optimal knowledge outsourcing model. Omega 31(6) 451-457.

Gomez-Meijia, L. R. and D. B. Balkin (1992). Determinants of Faculty Pay: An Agency Theory Perspective. Management Learning 27(1), 7-20.

Gottfredson, M., R. Puryear, and Phillips, S. (2005). Strategic Sourcing: From Periphery to the Core. http://www.itmission.com/outsourcing.pdf. 18 March 2008.

Gottschalk, P. and H. Solli-Sæther (2006). Maturity model for IT outsourcing relationships. Industrial Management & Data Systems 106(2), 200 - 212.

Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. American Journal of Sociology 91(3), 481-510.

Grant, R. M. (1991). The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation. California Management Review 33(3), 114-135.

Greaver II, M. F. (1999). Strategic Outsourcing: A Structured Approach to Outsourcing Decisions and Initiatives. American Management Association.

Greenemeier, L. (2002). Offshore Outsourcing Grows to Global Proportions. http://www.informationweek.com/story/IWK20020207S0011. Informationweek.com. February 11/ 2002, 12:00 AM

Gupta, U. G. and A. Gupta (1995). Outsourcing the IS Function: Is it Necessary for Your Organization? In Khosrowpour, M. (Ed.) Managing Information Technology Investments with Outsourcing. Hershey, PA, USA IDA Group publishing.

Hammond, R. K. (2007). Beyond Rationality: The Search for Wisdom in a Troubled Time. US, Oxford University Press

Harindranath, G. and G. Dhillon. (1997) International Outsourcing: Exploiting The Emerging Economy Option. In Mehdi Khosrow-Pour, D. B. A. (Ed.) Managing Information Technology Resources and Applications in The World Economy. Hershey PA, USA, Idea Group Publishin

Hancox, M. and R. Hackney (2000). IT Outsourcing: Frameworks for Conceptualizing Practice and Perception. Information Systems Journal 10(3) 217-237.

Heeks, R. (1999). Software Strategies in Developing Countries. Communication of the ACM 42(6), 15 - 20.

Hietala, J., J. Kontio, Juhana, J., Jokinen, and J. Pyysiäinen. (2004). Challenges of software product companies: results of a national survey in Finland.

Software Metrics, 2004. Proceedings. 10th International Symposium. IEEE Computer Society, 232-243.

Hindle, T. (2002). Guide to Management Ideas, The Economist Book, ISBN 978-1861974235

Hirschheim, R. (1998). Backsourcing: An Emerging Trend? September 1998. http://www.outsourcing-academics.com/backsourcing.html. 23.2001.

Hirschheim, R. (2006). Talk on Information Technology Sourcing. P. seminar. Oulu: INFWEST-IT Outsourcing seminar, Oulu, May 23.

Holsapple, C., W., and M. Singh (2001). The Convergence of Electronic Business and Knowledge Management. Berlin Springer-Verlag.

Jensen, M., S. M. Schlumberger, and LE Mangset, V Dalberg (2007). Managing Offshore Outsourcing of Knowledge-intensive Projects - A People Centric Approach. ICGSE 2007. Second IEEE International Conference on Global Software Engineering. IEEE Computer Society, 186-196.

Johnson, M. (1997). Outsourcing in Brief. Oxford Butterworth-Heinemann.

Järvinen, P. (2001). On Research Methods, Tampere: Opinpajan Kirja.

Kaplan, B. and D. Duchon (1988). Combining Qualitative and Quantitative Methods in Information Systems Research: A Case Study. MIS Quarterly 12(4): 571-587.

Kern, T. (1997). The Gestalt of an Information Technology Outsourcing Relationship: An Exploratory Analysis. Proceedings of the eighteenth international conference on Information systems. Atlanta, Georgia, United States, Association for Information Systems, 37 - 58.

Kern, T. and K. Blois (2002). Norm Development in Outsourcing Relationships. Journal of Information Technology 17(1) 33-42.

Kern, T. and J. Kreijger (2001). An exploration of the application service provision outsourcing option. System Sciences. Proceedings of the 34th Annual Hawaii International Conference.

King, W. R. (2001). Developing a Sourcing Strategy for IS: A Behavioral Decision Process and Framework. IEEE Transactions on Engineering Management 48(1), 15-24.

King, W. R. (2005). Outsourcing Becomes More Complex. Information Systems Management 22(2), 89 - 90.

King, W. R. (2006). Developing Global it Capabilities. Information Systems Management 23(4), 78 - 79.

King, W. R. and G. Torkzadeh (2008). Information Systems Offshoring: Research Status and Issues. MIS Quarterly 32(2), 205-225.

Klepper, R. (1993). Developing efficient relationships with I/S vendors: a contingency framework. Proceedings of the 1993 conference on Computer personnel research. St Louis, Missouri, United States, ACM, 197 - 205.

Kliem, R. (2004). Managing the Risks of Offshore it Development Projects. EDPACS 32(4), 12 - 20

Kobayashi-Hillary, M. (2005a). Outsourcing to India: The Offshore Advantage. Berlin, Springer.

Kobayashi-Hillary, M. (2005b). A passage to India. Queue 3 (1), 54-60

Kornstädt, A. and J. Saue. (2007). Mastering Dual-Shore Development – The Tools and Materials Approach Adapted to Agile Offshoring. In Lecture Notes in Computer Science (ed).Software Engineering Approaches for Offshore and Outsourced Development, Berlin / Heidelberg, Springer, 47, 83-95

Kumar, A. and P. Palvia, Eds. (2002). Key influence factors and issues in global IT outsourcing management, in Editors. Global Information Technology and Electronic Commerce. Marietta GA, Ivy League Publishing.

Lacity, M. C. and L. P. Willcocks (1995). Interpreting Information Technology Sourcing Decisions from a Transaction Cost Perspective: Findings and Critique. Accounting, Management, & Information Technology 5(3&4), 203-244

Lacity, M. C. and R. Hirschheim (1993a). The Information Systems Outsourcing Bandwagon. Sloan Management Review, 35(1), 73 - 86.

Lacity, M. C. and R. Hirschheim (1993b). Information Systems Outsourcing: Myths, Metaphors, and Reality. New York, NY: John Wiley and Sons.

Lacity, M. C. and L. Willcocks (2001). Global Information Technology Outsourcing: in Search of Business Advantage. New York, NY: John Wiley& Sons Ltd.

Layzell, P., O.P. Brereton, and A. French. (2000) Supporting collaboration in distributed software engineering teams. Proceedings of the Seventh Asia-Pacific Software Engineering Conference. IEEE Computer Society

Lee, J. A. N. (1992). Claims to the term 'time-sharing'. Annals of the History of Computing, IEEE 14(1), 16 - 54.

Jae-Nam, L., Huynh, M. Q., Kwok Ron, C.-W. and P. Shih-Ming. (2000) The evolution of outsourcing research: what is the next issue? System Sciences. Proceedings of the 33rd Annual Hawaii International Conference

Lee, J. A. N., J. McCarthy, and J. C. R. Licklider (1992). The beginnings at MIT. Annals of the History of Computing, IEEE 14(1), 18 - 54.

Lee, J. N. and Y. G. Kim (1999). Effect of Partnership Quality on IS Outsourcing Success: Conceptual Framework and Empirical Validation. Journal of Management Information Systems 15(4), 29-61.

Londe, B. L. (2004). Rising to the offshoring challenge–Part 2. Supply Chain Management Review 8(3), 9–10

Lonsdale, C. and A. Cox (1998). Outsourcing: A Business Guide to Risk Management Tools and Techniques. London Earlsgate Press.

Looff, L. D. (1995). Information Systems Outsourcing Decision Making: A Framework, Organizational Theories and Case Studies. Journal of Information Technology 10(4), 281-298.

Lyytinen, K., N. Nahar and N. Huda (2001). IT-supported Complex Technology Transfer in High-tech Sector. In Kocaoglu, D. F., Anderson, T. R., Milosevic, D. Z., Daim, T. U., Niwa, K., Gulledge, T. R., Kim, C. and Tschirky, H. (Eds.) Technology Management in the Knowledge Era. Oregon USA, IEEE and PICMET.

MacQueen, K. M., Mclellan, E., Kay, K. and Milstein, B. (1999). Codebook Development for Team-Based Qualitative Analysis. Cultural Anthropology Methods 10(2), 31-36.

Maier, R. (2004). Knowledge Management Systems. Information and Communication Technologies for Knowledge Management. Berlin, Springer-Verlag.

Malerba, F. and S. Torrisi, Eds. (1996). The Dynamics of market structure and innovation in the western European software industry. The international computer software industry: A comparative study of industry evolution and structure. Oxford, University Press.

Malone, T. W. and K. Crowston (1994). The interdisciplinary study of coordination. ACM Comput. Surv. 26 (1), 87-119

Malone, T. W., J. Yates, and Benjamin, R. I. (1987). Electronic Markets and Electronic Hierarchies: Effects of Information Technology on Market Structure and Corporate Strategies. Communications of the ACM 30(6) 484-497.

Matusik, S. F. and M. B. Heeley (2005). Absorptive Capacity in the Software Industry: Identifying Dimensions That Affect Knowledge and Knowledge Creation Activities. Journal of Management 31(4), 549-572.

McClelland, S. (1995). Telework's global reach. Telecommunications (International Edition) 29(9), 184-188.

McClelland, S. (2003). The outsourcing conundrum. Telecommunications International 37(12), 6

McFarlan, F. W. and R. L. Nolan (1995). How to Manage an IT Outsourcing Alliance. Sloan Management Review 36(2), 9-23.

McIvor, R. (2000). A practical framework for understanding the outsourcing process. Supply Chain Management: An International Journal 5(1), 22-36.

Meyer, B. (2006). The unspoken revolution in software engineering. Computer 39(1), 121-123.

Meyer, R. (1997). ITC Definition, Trinity University. http://www.cs.trinity.edu/itc/97-98/meyer.draft.txt. 2002.06.23.

Miles, M. B. and A. M. Huberman (1994). Qualitative Data Analysis: An Expanded Sourcebook, Thousand Oaks, Sage.

Momme, J. (2001). Framework for Outsourcing: Based on Theoretical Review and Empirical Findings from Danish Heavy Industry. In H.H. Hvolby, ed. The Fourth SMESME International Conference. Denmark: Department of Production, Aalborg University. http://iprod.auc.dk/sme2001/paper/smesme2001.pdf#page=265., 24.4.2002.

Momme, J. (2002). Framework for outsourcing manufacturing: strategic and operational implications. Computers in Industry 49(1), 59-75.

Momme, J. and H.-H. Hvolby (2002). An outsourcing framework: action research in the heavy industry sector. European Journal of Purchasing and Supply Management 8,(4), 185-196.

Mowshowitz, A. (1997). Virtual organization. Commun. ACM 40 (9), 30-37

Myers, M. D. (1997). Qualitative research in information systems. MIS Quarterly. 21 (2), 241-242

Myers, M. D. and D. E. Avison, Eds. (2002). Qualitative Research in Information Systems: A Reader. Introducing Qualitative Methods Series. London, Sage Publications.

Nahar, N. (1998). Risks Assessment of IT-Enabled International Technology Transfer: Case of Globalization of SMEs. In Rasmussen, L. B., Beardon, C. and Munari, S. (Eds.) Computers and Networks in the Age of Globalization: IFIP TC9 Fifth World Conference on Human Choice and Computers. Geneva, Switzerland, Springer, 407-418.

Nahar, N. (1999). IT-enabled Effective and Efficient International Technology Transfer for SMEs. In Zupancic, J., W. Wojtkowski, W. G. Wojtkowski and S. Wrycza.(Eds) Evolution and Challenges in System Development. New York USA, Kluwer Academic/Plenum Publishers, 85-98.

Nahar, N. (2001). Information Technology Supported Technology Transfer Process: A Multi-site Case Study of High-tech Enterprises. Jyväskylä Studies in Computing 9. Jyväskylä University.

Nahar, N., K. Lyytinen, N. Huda and S. V. Muravyov. (2006). Critical Success Factors for Information Technology Supported International Technology Transfer: Finding Expert Consensus. Information & Management 43(5), 663-677.

Nahar, N., T. Käkölä, and N. Huda. (2002). Software Production in Developing and Emerging Countries through International Outsourcing. Proceedings of the Information and Communication Technologies and Development: New Opportunities, Perspectives & Challenges, 7th International Working Conference of IFIP WG 9.4, S., Bangalore, by Indian Institute of Management Bangalore, 292 - 310.

Nam, K., A. Chaudhury, and H. R. Rao. (1995). A Mixed Integer Model of Bidding Strategies for Outsourcing. European Journal of Operational Research 87(2), 257-273.

Nam, K., S. Rajagopalan, and A.Chaudhury. (1996). A two-level investigation of information systems outsourcing Commun. ACM 39 (7), 36-44

Nicholson, B. and S. Sahay (2001). Some political and cultural issues in the globalisation of software development: case experience from Britain and India. Information and Organization 11(1), 25-43.

Nicholson, B. and S. Sahay (2004). Embedded knowledge and offshore software development. Information and Organization 14(4), 329-365.

Nooteboom, B. (1993). Firm size effects on transaction costs. Small Business Economics 5(4), 283 - 295.

O'Hara-Devereaux, M. and J. Robert (1994). GlobalWork: Bridging Distance, Culture and Time. San Francisco, Jossey-Bass.

Olsen, K. B. (2006). Productivity Impacts of Offshoring and Outsourcing: A Review, in OECD Directorate for Science, Technology and Industry (STI). O. F. E. C.-O. A. DEVELOPMENT, OECD.

Orlikowski, W. J. (2002). Knowing in Practise: Enacting a Collective Capability in Distributed Organizing. Organization Science 13(3), 249-273.

Orlikowski, W. J. and J. J. Baroudi (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. Information Systems Research 2(1), 1-28.

Overby, S. (2003). The Hidden Costs of Offshore Outsourcing. CIO magazine. http://www.cio.com/article/29654/The_Hidden_Costs_of_Offshore_Outsourcing. 12/02/2004

Pai, A. K. and S. Basu (2007). Offshore technology outsourcing: overview of management and legal issues. Business Process Management Journal 13(1), 1463-7154.

Pandely, V. and V. Bansal (2004). A Decision-Making Framework for IT Outsourcing using the Analytic Hierarchy Process. International Conference on Systemics,Cybernetics,Informatics, NISIET, Govt. of India I-VII.

Patane, J. R. and J. Jurison (1994). Is Global Outsourcing Diminishing the Prospects for American Programmers? Journal of Systems Management 45(6), 6-10.

Patton, M. Q. (1990). Qualitative evaluation and Research Methods. , Beverly Hills California, Sage Publications.

Pfannenstein, L. L. and R. J. Tsai (2004). Offshore Outsourcing: Current and Future Effects on American it Industry. Information Systems Management 21(4), 72 - 80.

Poppo, L. H. and M. Lacity (2002). The Normative Value of Transaction Cost Economics: What managers have learned about TCE principles in the IT context. In Hirschheim, R.; A. Heinzl and J. Dibbern.Information Systems Outsourcing in the New Economy. New York: Springer-Verlag, 253-276.

Preston, S. (2004). Lost in migration: offshore need not mean outsourced. Strategy & Leadership 32(6), 32 - 36

Press, L. (1993). Software Export from Developing Nations. IEEE Computer , 26(12)62-67.

Probert, D. R. (1996). The practical development of a make-or-buy strategy: the issue of process positioning. Integrated Manufacturing Systems 7(2), 44-51.

Qu, Z. and M. Brocklehurst (2003). What will it take for China to Become a Competitive Force in Offshore Outsourcing? An Analysis of the Role of Transaction Costs in Supplier Selection. Journal of Information Technology 18(1), 53–67.

Quinn, J. B., J. J. Baruch, and Zien, K. A. (1996). Software–based Innovation. Sloan Management Review 37(4), 1-2.

Rajkumar, T. M. and R. V. S. Mani (2001). Offshore Software Development. The View from Indian Suppliers. Information Systems Management. 18 (2), 1 11.

Rao, H. R., K. Nam, and Chaudhury, A. (1996). Information Systems Outsourcing. Communications of the ACM 39(7), 27-28.

Rao, M. T. (2004). Key Issues for Global it Sourcing: Country and Individual Factors. Information Systems Management 21(3), 16 - 21.

Robbins, S. (2004). Some Thoughts on our Globalized Workforce." Information Systems Management 21(3), 86 - 87.

Rottman, J. W. (2006). Successfully outsourcing embedded software development. Computer 39(1), 55-61.

Rottman, J. W. and M. C. Lacity (2006). Proven Practices for Effectively Offshoring IT Work. MIT Sloan Management Review 47(3): 56-63.

Richards, L. (1999). Using NVivo in qualitative research. Qualitative Solutions and Research. Melbourne Australia, Sage Publications.

Richards, L. (2002). Using NVivo in Qualitative Research. London, Sage Publication.

Richards, L. (2005). Handling Qualitative Data: A Practical Guide. London, Sage Publications Ltd.

Rockart, J. and S. Morton (1984). Implications of Changes in Information Technology for Corporate Strategy. Interfaces 14(1), 84-95.

Rönkkö, M., E. Eloranta, Mustaniemi, H., Mutanen, O.-P. and Kontio, J. (2007). Finnish Software Product Business: Results of the National Software industry Survey 2007. Helsinki, University of Technology, Software Business Laboratory.

Sako, M. and S. Helper (1998). Determinants of Trust in Supplier Relations: Evidence from the Automotive Industry in Japan and the United States. Journal of Economic Behavior and Organization Science 34(3), 387-417.

Scheibe, K. P., B. E. Mennecke, and and Christopher W. Zobel. (2006). Creating offshore-ready IT professionals: A global perspective and strong collaborative skills are needed. Journal of Labor Research 27(3), 275–290.

Shore, B. and V. Venkatachalam (1994). Prototyping: a metaphor for cross-cultural transfer and implementation of IS applications. Information & Management 27(3), 175-84.

Sink, H. L. and C. J. Langley (1997). A managerial framework for the acquisition of third-party logistics services. Journal of Business Logistics 18(2), 163-88.

Smith, M. A., S. Mitra, and S. Narasimhan (1996). Offshore Outsourcing of Software Development and Maintenance: A Framework for Issues. Information & Management 31(3), 165-175.

Sparrow, E. (2003). Successful IT Outsourcing: From Choosing a Provider to Managing the Project. New York, Springer Berlin Heidelberg.

Susarla, A., A. Barua, and A.B. Whinston. (2003). Understanding the Service Component of Application Service Provision: An Empirical Analysis of Satisfaction with ASP Services. MIS Quarterly, 27(1), 91-123.

Stake, R. E. (1995). The Art of Case Study Research. Thousand Oaks, CA Sage.

Straub, D., P. Weill, and K. Steward (2000). Strategic Control of IT Resources: A Test of Selective Outsourcing and Resource-Based Theory. Atlanta, GA Georgia State University.

Strauss, A. and J. Corbin (1990). Basics of Qualitative Research: Grounded Theory Procedures and Techniques. Newbury Park, CA Sage Publications.

Tafti, M. H. A. (2005). Risks factors associated with offshore IT outsourcing. Industrial Management & Data Systems 105(5), 549 - 560

Takeishi, A. (2002). Knowledge Partitioning in the Inter-Firm Division of Labor: The Case of Automotive Product Development. Organization Science 13(3): 321-338.

Tayles, M. and C. Drury (2001). Moving from make/buy to strategic sourcing: the outsource decision process. Long Range Planning 34(5), 605-22.

Taylor, P. (1996) Review of Information Technology: India's Software Industry. Financial Times November 6 ed., 1-6

Tellis, W. (1997). Introduction to Case Study. The Qualitative Report 3(2).

The Outsourcing Institute (2004). Outsourcing Index 2001. 27/3/2004. http://www.outsourcing.com. 12/6/2005.

Thibodeau, P. (2003). Offshore outsourcing is relentless, Computerworld. http://www.computerworld.com/careertopics/careers/story/0,10801,82578,00.html 23/07/2003.

TULLY, S. (1993) The Modular Corporation. IN FORTUNE (Ed.) *February 8, 1993*.http://money.cnn.com/magazines/fortune/fortune_archive/1993/02/08/77434/index.htm. 20/06/2003.

Van Assche, A. 2006. Modularity and the Organization of International Production, in HEC Montreal and CIRANO, Working Papers 2006s-09, Montreal.

Vashistha, A. and A. Vashistha (2005). Four myths of service globalization.. In A. Vashistha (Ed.) The Offshore Nation: The Rise of Services Globalization. India, Tata McGraw-Hill Publishing Company.

Veltri, N. F. and C. Saunders (2006). Antecedents of Information Systems Backsourcing. Information Systems Outsourcing. In Hirschheim, R.; A. Heinzl and J. Dibbern. (Ed.)Enduring Themes, New Perspectives and Global Challeng. Berlin, Springer Heidelberg, 83-102.

Vijayan, J. 2004. Offshore outsourcing poses privacy perils. Computer World, 38(8), 10.

Wallace, L., M. Keil, and A. Rai. 2004. Understanding software project risk: a cluster analysis. Information and Management, 42(1), 115-125.

Walsham, G. (1995a). Interpretive Case Studies in IS Research: Nature and Method. European Journal of Information Systems 4(2), 74-81.

Walsham, G. (1995b). The Emergence of Interpretivism in IS Research." Information Systems Research 6(4), 376-394.

Wegner, P. (1996). Interoperability. ACM Comput. Surv. 28(1), 285-287.

Wigand, R. T. and R. I. Benjamin (1996). Electronic Commerce: Effects on Electronic Markets. Journal of Computer Mediated Communications 1(3)0-0.

Wikipedia (2008). Information communication technology. 31 July 2008, at 21:48. http://en.wikipedia.org/wiki/Information_communication_technology. 4 August 2008.

Williamson, O. E. (1975). Market and Hierarchies: Analysis and Antitrust Implications, A Study in the Economics of Internal Organization. New York Free Press.

Williamson, O. E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations. Journal of Law and Economics 22(2), 233-261.

Williamson, O. E. (1981). The Economics of Organization: The Transaction Cost Approach. American Journal of Sociology 87(3) 548-577.

Williamson, O. E. (1985). The Economic Institutions of Capitalism: Firms, markets, Relational Contracting. New York Free Press.

Williamson, E. O. (1986). Economic Organization: firms, market and policy control. Brighton, Wheatsheaf Books.

Williamson, O. E. (1989). Transaction cost economics. In Schmalensee, R. and R. D. Willig (Ed) Handbook of Industrial Organization. North-Holland, Amsterdam, Elsevier Science, 41-65

Williamson, O. E. (1999). Public and Private Bureaucracies: A Transaction Cost Economics Perspective. J. Law Econ. Org 15(1), 306-342.

Wonseok, O. and Michael, J. G. (2004). An Empirical Assessment of Transaction Risks of IT Outsourcing Arrangements: An Event Study. Proceedings of the Proceedings of the 37th Annual Hawaii International Conference on System Sciences (HICSS'04) - Track 8 - Volume 8. IEEE Computer Society.

Wu, R. I. and M. S. Lin (1999). Globalization and Competition Policy: Taiwan's Experience. Taipei, Taiwam. Taiwan Institue of Economic Research.

Yalaho, A., Nahar, N., Käkölä, T. and Wu, C (2003). A Conceptual Framework for IT-Supported International Outsourcing of Software Production. Proceedings of the Conference on Information Science, Technology Management, Cape Town, South Africa.

Yalaho, A. (2006). A Conceptual Model of ICT-Supported Unified Process of International Outsourcing of Software Production. 10th IEEE International Enterprise Distributed Object Computing Conference Workshops (EDOCW'06), HongKong, China IEEE Computer Society, 47 -60.

Yalaho, A. and Nahar, N. (2007). The ICT-Supported Unified Process Model of Offshore Outsourcing of Software Production: Exploratory Examination and Validation. In Proceedings of Portland International Conference on Management of Engineering and Technology (PICMET'07)- The Management of Converging Technologies, Oregon, Portland USA, 1466-1483. CD ISBN 1-890843-15-6.

Yalaho, A., Nahar, N. and Heikkila, J. (2008). Key Success Factors for Managing Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Cross-case Study. In Palvia P., N. Baqir and K. Bagchi (Ed) Proceedings of the Global Information Technology Management Association World Conference (GITMA), Atlanta USA, 161-162.

Yalaho, A., Nahar, N., Käkölä, T. and Wu, C. (2005). A Conceptual Process Framework for IT-Supported International Outsourcing of Software Production. The IEEE EEE05 International Workshop on Business Services Networks (BSN). Hong Kong, IEEE, 13-23.

Yalaho, A. and C. Wu (2002). A Conceptual Framework for IT-Supported International Outsourcing of Software Production. Department of

Computer Science and Information Systems. Jyväskylä, University of Jyväskylä: 186.

Yalaho, A., Wu, C., Nahar, N. and Käkölä, T. (2004) IT-Supported International Outsourcing of Software Production: An Explorative Case Study. In Mehdi Khosrow-Pour, D. B. A. (Ed.) Proceedings of the 14th Information Resources Management Association International Conference. June, New Orleans, US, Volume 2, 844-852.

Yang, C. and J.-B. Huang (2000). A Decision Model for IS Outsourcing. International Journal of Information Management 20(3): 225-239.

Yin, R. (1994). Case Study Research: Design and Methods. 2nd edition. California., Beverly Hills: Sage Publications.

Zahra, S. A. and G. George (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. Academy of Management Review 27(2), 185-203.

Zatolyuk, S. and B. Allgood (2004). Evaluating a Country for Offshore Outsourcing: Software Development Providers in the Ukraine. Information Systems Management 21(3), 28 - 33.

APPENDIX 1 Interview questionnaire guide

Name of the interviewee:
Positions and contact details:

General Background of the outsourcing consumer

- Name of the company:
- Website:
- Contact information:
- The year of establishment
- How many people has your company employed?
- Area of expertise
- Software technological level

Business model:

- What is your business model? Are you providing tailored services (providing customer specific solutions),
- Developing components for mass markets (B2C)/ a few specific customers (B2B)/ other (pls. specify),
- Developing, products for mass makets (B2B)/ a few specific customers (B2B)/ other (pls. specify), or
- Integrating components into larger system products that are sold as complete packages and that solve relatively large set of problems of a customer holistically?
- If you are developing software products or system products (including hardware), which methods do you use for software product concept creation (i.e., discovering, assessing, justifying, and prioritizing product ideas and foaming product concepts about these ideas)?
- If you are developing software products, what is the software development process you are using?
- How do you use information systems to support product concept creation, systems design, coding, testing, and maintenance?
- What are the marketing and business strategy (product line development, product line management, others) focus areas during the software product development process?
    - How do you commercialize your software products?
    - Who are your competitors? What are their strengths and weaknesses in comparison to you?
    - How do you compete (e.g., rapid entry to new markets that you competitors do not address properly, providing higher quality products, providing attractive pricing, buying your competitors and/or their products)?
    - What is your revenue model, that is, how do you make money?
    - How do you split revenues with your distribution channels?
    - Is the business model moving/shifting? How?

A. General background regarding the outsourcing service consumer and its outsourcing experience

1. Industry in which main activities are concentrated?
2. Have your company done international outsourcing project? Where? When? How many projects have you done?
3. What are your major software technologies?

B. Examining outsourcing issues

1. What software did you outsource and what were their characteristics?
2. Did you outsource software development or conversion (for example legacy transformation to Web-based)?
3. Why did you choose outsourcing over in-sourcing?
4. How did you evaluate for the suitability to outsource?
5. Why did you choose international outsourcing over domestic outsourcing? In other words, why have you outsourced to foreign countries instead of inside the country to some other companies?

C. General background regarding the outsourcing service provider and the country where the IOSP is located

1. Background information of the outsourcing service provider
   - Name of the company and contact information
   - Year of the establishment
   - Location of the company
   - Software technological level
   - Software products and services produced by the company

2. Background information of the country where the IOSP is located
   - How is the software engineering education level of the country?
   - How is the availability of the software professionals?
   - How is the English proficiency of the software professionals?
   - How is the telecommunications infrastructure?

D. Offshore outsourcing process

1. What were the phases in the international software outsourcing process? Please indicate them in a chronological order.

D1. Offshore market research for software production through outsourcing

1. Why was the international market research phase important?
2. Which factors listed below played an important role in selecting the country for software production?
   - Availability of the software professionals and companies
   - Low salary
   - Other low production expenses
   - Relatively developed telecommunications infrastructure
   - Nearby geographical distance
   - Cultural factors, and
   - Others
3. How did you use IT and other traditional tools in selecting the appropriate country?
   - Country specific databases

- Industry specific databases
- Professional databases
- DVD/VCD with market data
- Agent technology
- Internet directories
- Online research sites
- Search engines
- E-mail
- Internet telephony
- Video conferencing, and
- Others

4. Which benefits did you get?
5. Which problem did you encounter?
6. How did you overcome these problems?
7. Why did not/did you select a country nearby Finland?

D2.Offshore promotion of software production through outsourcing

1. Why was the international promotion of software production through outsourcing phase important?
2. Which tasks were performed in international promotion phase and in which order?
3. How did you use IT and other traditional tools in international promotion?
4. Which benefits did you get?
5. Which problems did you encounter?
6. How did you overcome these problems?

D3. Selection of the outsourcing service provider

1. Why was the selection of the outsourcing service provider phase important?
2. Which factors listed below played an important role in selecting the company for software production?

- Software technological level
- Standard methodology
- Size of the company
- Successful experience in dealing with Western companies
- Stable relationship with domestic programming companies
- Connections, positions with key industry organizations
- Location of key office
- Relationship and strategic alliances
- Industry knowledge
- Financial resources, and
- Others

3.What was the area of expertise of the IOSP?

- Networks and telecommunications
- Mobile station software
- Computer telephony

4. Did you examine the quality of the process used to develop software?
If you did, how did you check their:

- Development process
- Development tools
- Testing methods
- Testing tools
- Previous performance of on-time-delivery.

5. Did you check your potential outsourcing providers' client list?
6. How did you use IT and other traditional tools in selecting the appropriate outsourcing service provider?
7. Which benefits did you get?
8. Which problems did you encounter?
9. How did you overcome these problems?

D4. Negotiation and contract

1. Why is negotiation and contract phase important?
2. Which of the following issues were negotiated?
    - Software product and/or service requirements
    - Components of the software technology package that should be transferred
    - Delivery time to the completed product
    - Cost of the contract to be calculated on the basis of the fixed price or on hourly basis
    - Payment mechanism, and
    - Non disclosure agreement
3. Which of the following areas were in contract?
    - Scope of the responsibilities and services
    - Third-party services
    - Project managers
    - Project development standards and acceptance
    - Project timetables and milestones
    - Progress reports and meetings
    - Problem resolution and escalation of differences
    - Acquisition of systems and facilities
    - Final acceptance testing
    - Documentation
    - Training
    - Fees
    - Company's proprietary rights
4. How did you use IT and other traditional tools in this phase?
5. Which benefits did you get?
6. Which problems did you encounter?
7. How did you overcome these problems?
8. Which traditional methods were used in this phase and why?

D5. Implementation and management of the outsourcing project

1. How do you proceed to set up your international outsourcing project?
2. How the outsourcing project was planned?
3. In which areas did you provide training?

4. How did you use IT for training?
5. Which traditional methods did you use?
6. Was the training provided at your premise or the outsourcing service provider's premise?
7. How did you provide support for technical activities?
8. Did the outsourcing service provider report to you about the progress on a regular basis? How did he report?
9. How did you review the milestones?
10. How the quality assurance was performed?
11. How was the produced software tested?
12. How many different types of tests did you conduct?
13. How did you monitor and measure quality?
14. How or which technology did you use in managing your project?
15. How did you measure the results?
16. Which are the common negative consequences of international outsourcing and which measures were taken to avoid these negative consequences?

D6. Managing the relationship

1. Which kinds of strategies were used in this phase and why?
2. Which problems did you encounter?
3. How did you overcome these problems?

D7. Handling of financial issues

1. Did you make part of the payment at the inception stage of the project and rests at the completion stage, or
2. Did you adopt a customized payment mechanism?
3. What problems were encountered in this phase? How were they solved?

D8. Delivery of the products and documentation

1. How the ready software products along with the documentation were delivered?

D9. Evaluation

1. How successful was the project?
2. Did you meet your targets in the following rests?
    - Quality
    - Cost
    - Delivery time
3. What were the reasons for not meeting some of the targets?
4. Which methods were used in this phase and why?
        a. After completion of the outsourcing project, did you start with a new order?

D10. Transfer of knowledge

1. What type of knowledge did you transfer?
2. How knowledge was transferred?
3. What type of difficulties did you encounter in transferring knowledge?
4. What type of knowledge did you received?
5. Did you use IT to support your knowledge transfer?
    a. If yes what type of IT tools did you used?
    b. If no why

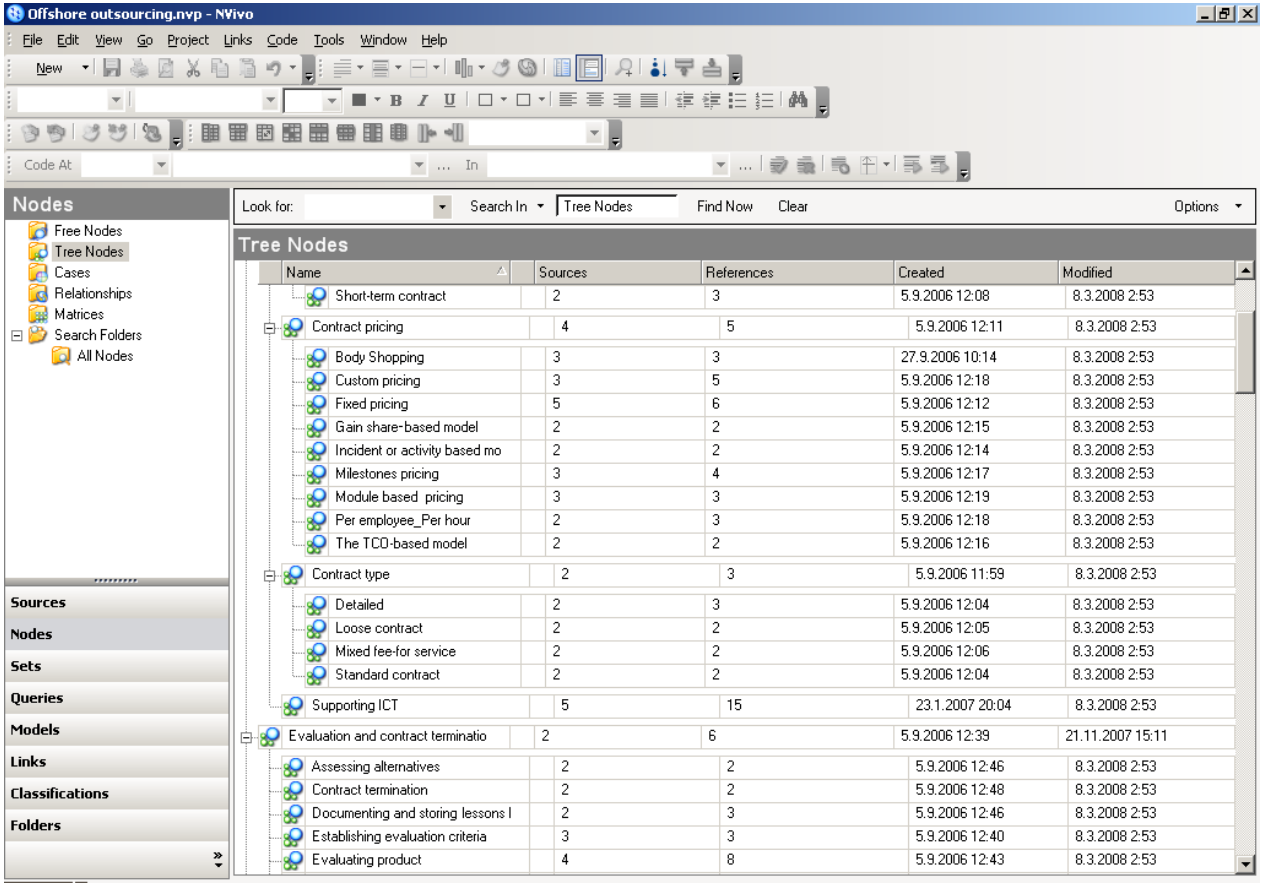
D11. Risk factors of IT-supported international outsourcing of software production

1. What are the risk factors of IT-supported international outsourcing of software production?
2. What strategy did you use to avoid those risks?
3. What type of risk factors did encounter in your International outsourcing project?

D12. Success factors

1. How successful was the outsourcing projects and which factors contributed to the success and how?
2. What are in your opinion (on the basis of your firm's experiences of several outsourcing projects) the majors' factors that can contribute to the success of outsourcing?
3. Which measures can be taken in order to enhance the success of IT-supported international outsourcing of software production?

APPENDIX 2 A Snapshot view of Code tree in NVivo7



YHTEENVETO

Länsimaiset ohjelmistointensiiviset huipputeknologia-alan yritykset siirtävät ohjelmistojen ja oheispalvelujen tuotantoaan yhä kasvavassa määrin kehitysmaihin. Nopeasta kasvusta huolimatta tällaisen ulkomaille etäulkoistamisen erilaiset riskit on syytä tutkia, jotta yritykset voisivat hyödyntää kyseisen liiketoimintamallin mahdollisuuksia. Etäulkoistamisesta ja sen johtamisesta on tehty yleisesti lukuisia tutkimuksia. Suurin osa olemassa olevasta alan kirjallisuudesta käsittelee tietotekniikan etäulkoistamista asiakkaan, ulkoistavan yrityksen näkökulmasta. Tietohallintojohdon tarpeisiin on luotu useita viitekehyksiä IT-järjestelmien etäulkoistamisen toteuttamiseksi käytännössä. Viitekehykset kattavat osa-alueita kuten IT-järjestelmien etäulkoistamisen päätöksentekomallin, riski-hyöty-analyysin, kuluanalyysin, kompetenssianalyysin, etäulkoistamisprojektin luottamuksenhallinnan, suhdetoimintamenettelyt, hankintastrategian, etäulkoistamisen riskien hallinnan jne. Yksikään näistä viitekehyksistä ei kuitenkaan ohjeista kokonaisvaltaisesti ohjelmistotuotannon ulkomaille etäulkoistamisen johtamista.

Etäulkoistamista tukevista tietojärjestelmistä, riskin mittaamisesta ja onnistumisen menestystekijöistä ei ole juurikaan tehty empiiristä tutkimusta. Näin ollen tämän tutkimuksen päätavoite on kehittää ohjelmistotuotannon etäulkoistamiseen soveltuva ICT-SUPOO -malli (ICT-supported unified process of offshore outsourcing), joka yhdistää ulkomaille suuntautuvan etäulkoistamisen prosessit etäulkoistamisprosessit, riskienhallintaprosessit ja suhdetoimintahallinnan prosessit.

Tutkimuksen tutkimuskysymys on: kuinka tieto- ja viestintäteknologiat avustavat ohjelmistoyrityksiä ulkomaille etäulkoistamisprosessissa? Tutkimuksen alakysymykset ovat seuraavanlaisia:

1. a) Mitä vaiheita ICT-SUPOO malliiin kuuluu? b) Miten mallin vaiheitten onnistumista mitataan ja johdetaan ulkomaille etäulkoistamisen aikana? ja c) Millä tieto- ja viestintäteknologian välineillä tuetaan parhaiten etäulkoistamisprosessia kokonaisuudessaan ja sen jokaista vaihetta erikseen?

2. Kuinka ulkoistajan ja palveluntuottajan välisiä etäulkoistamissuhteita luodaan, harjoitetaan ja johdetaan kansainvälisessä ohjelmistokehityksessä?

3. Miten ICT-SUPOO -mallin riskit hallitaan?

4. Mitkä ovat ICT-SUPOO -mallin menestystekijät?

Tutkimus koostuu kolmesta osasta: a) kirjallisuuskatsauksesta, joka kattaa etäulkoistamisen, tietotekniikan etäulkoistamisen, ulkomaille etäulkoistamisen sekä teemaan läheisesti liittyvän globaalin ohjelmistokehityksen, hajautetun oh-

jelmistokehityksen sekä tieto- ja viestintäteknologian aiemman tutkimuksen; b) vaihdantakustannusteorian soveltamisen ulkomaille etäulkoistamisen analysointiin c) tapaustutkimusta neljästä huipputeknologian yrityksestä. Tulkitsevalla tutkimusotteella tehdyt tapaustutkimukset on tehty tarkastelemalla tutkimuskysymyksiä sekä palveluntarjoajan että asiakkaan näkökulmista

Artikkelissa I analysoidaan ICT-SUPOO -mallin tärkeimmät prosessit ja niiden toiminnot, suorituskyvyn mittoja ja toimitusta kirjallisuuskatsauksen perusteella.

Artikkelissa II ICT-SUPOO-malli validoidaan monimenetelmällistä, vertaileva tapaustutkimusta käyttäen sekä palveluntuottajan että asiakkaan näkökulmasta. Haastatteltavina on ohjelmistotuotannon ulkomaille etäulkoistamisprosessien johtamisessa vankan asiantuntemuksen hankkineita ammattilaisia.

Artikkeleiden I ja II perusteella, ICT-SUPOO koostuu seuraavista vaiheista: a) strategisten kompetenssien analyysi, b) kansainvälisten markkinoiden kartoitus, c) palveluntarjoajien valinta, d) sopimusneuvottelut, e) projektin toimeksianto ja toteutus f) ja arviointi sekä sopimuksen lopettaminen. Edellä olevat vaiheet toteutetaan samanaikaisesti riskienhallintaprosessien kanssa Vaiheiden a-c jälkeen käynnistyy suhdetoiminta sopimusneuvottelulla. Suhdetoiminta jatkuu projektin päättymiseen saakka. Tutkimuksessa käy selvästi ilmi, etteivät suhdetoiminta ja riskienhallinta ole prosessin sisäisiä vaiheita kuten aikaisemmissa tutkimuksissa on osoitettu (katso, esim. Momme, 2001; Yalaho & Wu, 2002; Momme & Hvolby, 2002; McIvor, 2000). Suhdetoiminta ja riskienhallinta ovat kehittyviä toimintoja, joita ei voi esittää erillisinä vaiheina ja jotka tapahtuvat ICT-SUPOO -mallin muiden vaiheiden yhteydessä. Tämä on tutkimuksemme tuottama löydös, joka ei ole tullut esiin aiemmissa tutkimuksissa.

Vaihdantakustannusteorian (”Transaction Cost- theory” -teorian avulla havaittiin seuraavaa:

a) Palvelun tarjoajat käyttävät erityisiä toimenpiteitä tavoittaakseen potentiaaliset asiakkaansa, esim.hakupalvelujen kautta, jolloin etsintä- ja markkinointikustannuksetvähenevät (Artikkeli II, Phase 2, palvelun tarjoajan näkökulma).
b) Ulkomaiset palveluntarjoajat keskittyvät tiettyihin strategisiin maihin, joihin heillä on kustannusetu (halvempi kuin maassa toimivilla kilpailijoilla).
c) Molemmilla tutkituilla ulkoistajilla on aikaisempaa kokemusta etäulkoistamisesta ja ne ovat toimineet useita vuosia etäulkoistuspalvelun tarjoajan kotimaassa. Siten he tuntevat liiketoimintakäytänteet ja useimmat alan toimijat.
d) Palveluntarjoajat valikoivat tarkkaan mihin palveluihin sitoutuvat. Palveluntarjoajan tietämys ja ulkoistamisesta karttunut kokemus auttaa oikeanlaisen valinnan tekemiseen sopimustilanteessa.
e) Sopimukset vahvistetaan sosiaalisilla suhteilla. FinSoftAlfa ja sen partneri, IndiaSoftNet erityisesti ymmärsivät sopimuksen työkaluna, joka tarjoaa minimiehdot ja -turvan, mutta pitkäaikainen, terve ja kestävä yhteistyösuhde, edellyttää sosiaalisin suhtein vahvistettua

luottamussuhdetta. Asiakkaat ja palvelun tarjoajat valittavat usein opportunismista, vaihdantakustannusten kasvusta sekä kyvyttömyydestä vaikuttaa yhteistyösuhteeseen. Kuitenkin uskon monien näistä yritysten kokemista ongelmista olevan lievennettävissä.

Artikkeli III käsittelee etäulkoistettuja yhteistyösuhteita asiakkaan ja palvelun tarjoajan välillä useiden tapaustutkimusten kautta. Tulokset on esitetty ulkomaisten etäulkoistettujen järjestelmien kehittämistä käsittelevän aikaisemman IS -kirjallisuuden tapaan.

Artikkelissa IV tutkitaan ja analysoidaan usemman tapauksen poikittaisanalyysin'perusteella riskitekijöitä, jotka saattavat vaikuttaa ICT-SUPOO:n toimintaan, mikäli niihin ei ole varauduttu huolellisesti etukäteen ja mikäli sopivia vastatoimenpiteitä ei ole mietitty näiden negatiivisten vaikutusten minimoimiseksi. Tutkimuksen yritykset kohtasivat merkittäviä riskejä käyttäessään ICT-SUPOO mallia ohjelmistotuotannossa. Muutamat ICT-SUPOO mallin riskeistä ovat yhteneviä aiempien tutkimusten kanssa, mutta uusia riskitekijöitä ovat, mm.: a) ulkoistetun liiketoiminnan ymmärryksen puute asiakkaan puolelta, b) täsmällisen riskianalyysin puute, c) valuuttakurssiriski, d) palveluntarjoajan opportunismi, e) maineen menetyksen riski, f) erilaiset tulkinnat projektin tarkasta määrittelystä, g) projektin pitkittämisen (epäonnistuneet) sanktiot, h) paikallisen lain tulkinta konfliktitilanteessa, i) erilaiset projektinhallintakäytännöt, j) asiakkaan riittämättömät projektinhallintataidot k) asiakkaan riittämätön tekninen ymmärrys, l) maksujen viivästyminen, m) asiakkaan liiallinen puuttuminen yksityiskohtiin ja n) epäselvä strategia IT-tuen hyödyntämiseksi kommunikaatiossa, koordinoinnissa ja yhteistyössä. Tämän lisäksi tämä tutkimus tuo esiin strategioita, jotka ovat tarpeellisia vastaantulevien riskien lieventämiseksi ja ICT-SUPOO mallin onnistumiseksi ohjelmistotuotannossa.

ICT-SUPOO -mallin tunnistamia riskejä ohjelmistotuotannossa ei voi kuitenkaan kokonaan välttää, sillä jotkut tekijät (kuten poliittinen epävakaus) eivät ole asiakkaan ja palvelun tarjoajan vaikutettavissa. Yritysten tulee olla valmistautunut niiden varalta tehokkailla riskienhallintastrategioilla

Artikkelissa V ICT-SUPOO -mallin mukaisen ohjelmistoprojektin menestystekijät tunnistetaan ja analysoidaan vertailevan tapaustutkimuksen avulla. Tässä tutkimuksessa monet ICT-SUPOO -mallin mukaiset ohjelmistotuotannon menestystekijät ovat samoilla linjoilla ulkomaille etäulkoistus kirjallisuuden kanssa (ks. Artikkeli V). Kuitenkin uusia onnistumistekijöitä tunnistettiin tässä tutkimuksessa seuraavasti: a) IS:n tarkan määrittelyn mukaan sovitut käytänteet, b) prosessin tehokas globaali koordinointi ja hallinta, c) henkilökohtaiset suhteet/kontaktit, d) yrityksen sopiva koko, e) soveltuvat ICT-työkalut ja niiden tehokas käyttö, ja f) yhdistetyt prosessit

ICT-SUPOO -malli esittelee holistisen hallintaprosessin ulkomaille etäulkoistamisen johtamiseen. Tämä tutkimus myös tunnistaa tekijöitä, jotka johtavat onnistumiseen ja toisaalta tekijöitä, jotka aiheuttavat riskejä/esteitä IT-tuetun yhtenäistetyn prosessin etäulkoistamiselle. Molemmat tekijät voivat auttaa sekä asiakkaita että palveluntarjoajia, jotka pyrkivät etäulkoistamaan toimintaansa.

On myös huomattava, että ulkomaille etäulkoistamisen malli tässä tutkimuksessa käsittelee monia erityyppisiä informaatio- ja kommunikaatioteknologioita, eikä rajoitu pelkästään suosituimpiin teknologioihin kuten emailiin, chattiin, uutisryhmiin, web-teknologioihin ja tietokantoihin. Siten tämä tutkimus tarjoaa alan rikkaamman ymmärryksen ja lisää näkökulman ulkoistamisen ja ulkomaille etäulkoistamisen tieteenalan tietämykseen.

Avainsanat: ulkoistaminen, ulkomaille etäulkoistaminen, ulkomainen järjestelmäkehitys, yhtenäistetty järjestelmäkehitys, yhteistyösuhteiden hallinta, riskien hallinta, menestystekijät, informaatio- ja kommunikaatioteknologia, IT-tuki, vaihdantakustannusteoria